+

AN ASSESSMENT OF CONSUMERS' WILLINGNESS TO PAY FOR ATTRIBUTES OF MILK AND DAIRY PRODUCTS WITH THE 100% CANADIAN MILK SYMBOL

Thesis Submitted to the College of
Graduate Studies and Research
in Partial Fulfillment of the Requirements
For the Degree of Master of Science
in the Department of Bioresource Policy, Business and Economics,
University of Saskatchewan
Saskatoon
By
Shelicia Forbes-Brown

PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis work or, in their absence, by the Head of the Department or the Dean of the College in which my thesis work is done. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition will be given to me and the University of Saskatchewan in any scholarly use that may be made of any material in this thesis.

Requests for permission to copy or to make other use of the material in this thesis in whole or part should be addressed to:

Head of the Department of Bioresource, Policy, Business and Economics
University of Saskatchewan
51 Campus Drive
Saskatoon, Saskatchewan
S7N 5A8

ABSTRACT

Consumers are becoming increasingly concerned about their foods and more particularly, the origin of their foods and the ingredients they contain. In light of the demand for additional origin information, the 100% Canadian milk branding initiative was launched in 2009 as a means of informing consumers about the origin of milk in their dairy products. The information is indicated by the presence of the 100% Canadian milk symbol on dairy products and can be characterized a form of co-branding. The literature on co-branding stipulates that co-branding can result in changed product perceptions either negatively or positively. In addition, the willingness to pay (WTP) literature stipulates that WTP is determined by product attributes and individuals' characteristics.

This thesis therefore seeks to ascertain the factors affecting consumers' preferences and WTP for products with the *100% Canadian milk* symbol. Specifically, the effects of individual characteristics such as health consciousness, patriotic values and risk perceptions on preferences for dairy products with the symbol are evaluated. Concurrently, the study explores the relationship between respondents' knowledge of the Canadian dairy industry and WTP for the symbol. Data were gathered from a total of 1012 milk and ice cream consumers using two nationwide internet surveys. Estimations are carried out using the Multinomial Logit (MNL) and the Random Parameter Logit models (RPL).

The results suggest that consumers in general have positive perceptions of milk and ice cream with the *100% Canadian milk* symbol but negatively perceive store brand and organic labels. However, in some cases, combining a store brand label or organic label with the *100% Canadian milk* symbol, are shown to alter consumers' perceptions of the product. Some socio-demographic variables and individual characteristics were also found to be influential in intended purchase behaviours and WTP for milk and ice cream. The findings from this study provide information on consumers' perceptions and attribute preferences and are expected therefore to contribute to the marketing strategies of the Canadian dairy industry as a whole.

ACKNOWLEDGEMENTS

“For I know the plans I have for you, declares the LORD, plans to prosper you and not to harm you, plans to give you hope and a future.” (Jeremiah 29:11)

I would like to thank the lord who has made this journey possible, my husband for his love and unyielding support, my mother and sisters for their encouragement and prayers.

I would also like to express my sincere gratitude to my supervisors Dr. Jill Hobbs and Dr. Eric Micheels for their guidance, suggestions, and most of all their patience. I must also express my gratitude to the committee members: Dr. Cakir Metin and Professor Rob Roy for advice and suggestions and for agreeing to be a part of my committee. Professor Kerr and Professor Chaban, you may not be aware of it, but you encouraged me and gave me hope- for this I would like to express my thanks.

I would also like to thank the office staff: Barb Burton, Deborah Rousson, and Lori Hagen (former staff member) for their resourcefulness and kindness.

Finally, I would like to thank the Canadian Dairy Commission and Alliance for Food and Bioproducts Innovation for their financial support, which made this project possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter I: Consumers' Preferences and the 100% Canadian Milk Brand

1.1. Introduction

Canadian consumers are becoming increasingly concerned about the origin and production methods used to process their foods including their dairy products (Alberta Agriculture and Rural Development, 2011; Agriculture and Agri-Food Canada, 2009a; Kuperis, Veeman, & Adamowicz, 1999). In light of this, marketing strategies are most frequently geared towards highlighting information on the origins and processing methods of products.

It is in this vein that in 2009, the Dairy Farmers of Canada launched a national branding programme aimed at informing consumers about the 100% Canadian milk symbol (Dairy Farmers of Ontario, 2009). Specifically, they noted that products displaying the symbol contained milk that is of "*high-quality, fresh, safe and containing no antibiotic residues and hormones*" (Dairy Goodness.ca). The symbol appears on several dairy products in Canada including milk, although all fluid milk (except chocolate milk) is 100% Canadian. In addition to promoting quality attributes, the 2009 branding initiative was also aimed at appealing to a certain level of nationalism in consumers by suggesting that purchasing dairy products with the 100% Canadian milk symbol would be akin to buying Canadian products that are produced in accordance with the high standard of Canadian values and would support the Canadian economy.

The branding campaign can be regarded as timely. In light of an increased number of reported foodborne illnesses in recent times,[1] consumers are seeking the assurance that they are purchasing products that are safe for consumption. Although the issue of foodborne illnesses is not new, consumers are becoming increasingly aware that

[1] In 2008 an outbreak of listeriosis resulted in the death of 23 Canadians (Canadian Food Inspection Agency, 2011)

foodborne illnesses are prevalent and can result from the consumption of just about anything. As seen in Table 1.1 (which for illustrative purposes documents cases back to the 1980s), both processed and unprocessed foods ranging from bean sprouts to apple juice and peanut butter have resulted in illnesses.

Table 1.1: Selected Foodborne Illnesses by Countries

Year of Outbreak	Country	Outbreak, Product Source	Source
2011	Germany	E. coli- Bean sprouts	BBC News Europe, 2011
2011	USA	Salmonella - Ground Beef	Centers for Disease Control and Prevention, 2012
2010	USA	Salmonella- Eggs	Centers for Disease Control and Prevention, 2010
2008	Canada	Listeria - Maple Leaf foods	Public Health Agency of Canada, 2012
2007	USA	Salmonella- Peanut Butter	Centers for Disease Control and Prevention, 2007
2006	USA	E. coli- Spinach	Centers for Disease Control and Prevention, 2006
2005	United Kingdom	E. coli- Meat	BBC News Wales, 2010
1999	USA	Salmonella- Orange Juice	Marlerclark.com, 1999
1996	USA	E. coli- Apple Juice	Los Angeles Times, 1996
1985	USA	Salmonella- Milk	The New York Times, 1985

Source: Compiled by Author

Consumers often seek different preventative methods and means of guarding against food related illnesses. Willingness to pay (WTP) can reflect differences in preferences and attitudes towards foodborne illnesses. Essentially, with consumers expressing concern about the food they purchase, discriminatory preferences are exhibited among similar products. Discriminatory preferences result in varying WTP based on differences in

product attributes such as origin information, product type, and brand. This type of behaviour however varies from individual to individual given that some consumers may exhibit higher risk preferences than others. A broad look at the literature on WTP will show that most of the factors influencing WTP fall into two categories: 1) product attributes, and 2) individual factors

This thesis primarily intends to ascertain Canadian consumers' preferences and attitudes toward products displaying the 100% Canadian milk symbol (depicted in Figure 1.1). By extension, this research will examine consumers' WTP in the context of the 100% Canadian milk symbol by assessing how factors related to attributes of dairy products (attributes such as the *100% Canadian milk* symbol, whether the product is conventional or organic, and generic brands) and individual characteristics (such as risk preferences and values) affect WTP for milk and ice cream.

Figure 1.1: The 100% Canadian Milk Symbol
Source: Dairygoodness.ca

1.1.1 About the 100% Canadian Milk Brand

The 100% Canadian milk symbol appears on several dairy products throughout Canada including: milk, cheese, ice cream and yogurt (see Appendix A for some examples). Although not a brand in the usual sense of the word, Dairy Farmers of Canada markets the symbol as a brand used to identify dairy products made from 100% Canadian milk (Dairy Farmers of Ontario, 2009). The 100% Canadian milk branding initiative provides a marketing approach for Canadian produced milk and dairy products based on the explicit representation of country of origin information. With this in mind, there have been a number of changes to the strategies used to market Canadian dairy products over

the years. These strategies have become more conspicuous and less ambiguous with each modification (see Appendix A). "*Prior to 1996, the (*Canadian milk) *symbol consisted solely of the cow, from 1996 to 2008 the signature "Quality Milk" was added to qualify the main ingredient and add meaning to the symbol"* (Dairy Goodness.ca). Dairy farmers of Canada launched the 100% Canadian milk brand in 2009, explicitly reflecting the origin of milk (as a product and milk as an ingredient in dairy products), and this new symbol then replaced the "Quality Milk" label. Whereas "Quality Milk" can be regarded as generic, the 100% Canadian milk symbol provides a more explicit and specific signal about the product's origin (in the case of milk) or ingredient origin (for end use products containing milk). Consumers are then free to determine what the explicit origin information means to them and how much value should be placed on this extrinsic cue.

The symbols used to identify the 100% Canadian milk products were modified due to increasing consumer demand for origin information. As Ian MacDonald, National Director of Marketing and Nutrition with Dairy Farmers of Canada states "*The explicit clarity of the new 100 percent Canadian Milk brand responds to growing consumer demand to clearly identify the origin of all food products on the package*." (The AgriPost, 2009). However, not all products made from 100% Canadian milk display the symbol. In light of this, it would be interesting to assess whether consumers are willing to pay more for products (particularly milk and ice cream) with the symbol as opposed to those without, and why. Products with the symbol can be thought of as being marketed by two or more brands (co-branded). Within this context there might be valuable insights from the co-branding literature that could inform the investigation of the role of the 100% Canadian milk symbol in preferences for dairy products. In its simplest form, co-branding refers to the combination of two or more brands to market a single product. Co-branding is evident in the dairy industry when the 100% Canadian milk symbol is used in marketing store brand or national brand milk, cheese, ice cream and other dairy products given that it was launched as a brand.

1.2 Problem Statement

While some consumers may be interested in products co-branded with the 100% Canadian milk symbol, others may be indifferent towards products with and without the symbol. Such differences in consumers' preferences are expected as consumers' are heterogeneous and different consumer groups will have varying degrees of preferences towards product attributes. It is therefore expected that factors related to product attributes and consumers' characteristics will determine consumers' preferences for products with the 100% Canadian milk symbol and by extension explain the conditions under which co-branding tends to succeed. In addition, consumers' knowledge about the dairy industry may also contribute to their WTP for dairy products with the 100% Canadian milk symbol. A knowledgeable consumer would know that under the supply management system in Canada, all milk except chocolate milk is 100% Canadian milk. Being privy to such information may affect preferences and willingness to pay for milk with the symbol. However, it is uncertain how different factors such as consumers' perceptions of dairy products with the *100% Canadian milk* attribute itself, individual characteristics and knowledge of the dairy industry influence preferences for products co-branded with the *100% Canadian milk* attribute, therefore, the conditions under which co-branding tends to succeed in the dairy sector are unclear.

1.3 Objectives

In light of the previous section, an overarching question emerges - what are the drivers of preferences and WTP in the context of the *100% Canadian milk* symbol? In answering this question, specifically for milk and ice cream co-branded with the *100% Canadian milk* symbol, this research aims to:

1) Assess the attributes/factors affecting consumers' preferences for milk and ice cream.
2) Ascertain Canadian consumers' willingness to pay for milk and ice cream co-branded with the *100% Canadian milk* symbol.
3) Ascertain how WTP is moderated by consumers' perceptions of milk and ice cream with the *100% Canadian milk* attribute:

- What does it signal to consumers; is it a health symbol, a national symbol, or a food safety symbol that is influencing WTP by consumers?

4) Identify potential target markets for co-branded dairy products based on socio-demographic and socio-economic characteristics.

1.4 Methodology

The research utilizes a stated preference approach to examine Canadian consumers' preferences for dairy products. To this end, two internet surveys were administered to respondents in both English and French. One version assessed preferences and WTP for milk co-branded with the 100% Canadian milk symbol, while the other examined attitudes toward ice cream co-branded with the 100% Canadian milk symbol. The information obtained from the discrete choice experiment is used in estimating Multinomial Logit (MNL) and the Random Parameter Logit (RPL) models.

This research is expected to add to the literature on consumers' perceptions of product attributes and how this translates into their WTP for Country of Origin Labelling (COOL). In addition, it is expected to highlight the conditions under which co-branding in the dairy industry tends to succeed and by extension the possible implications of creating brand alliances (co-branding) within the dairy food supply chain in Canada. Therefore, the results obtained are expected to guide future market studies and marketing strategies in the dairy industry.

1.5 Outline of the Study

The remainder of the study is structured as follows: Chapter 2 reviews the relevant literature within the area of consumers' preferences and WTP. Chapter 2 also provides a general overview of the factors affecting perceptions of co-branded products and discusses trends in the Canadian dairy industry. Chapter 3 discusses the theoretical framework as it relates to factors affecting consumers' purchasing decisions and how these factors may translate into consumers' WTP for milk and ice cream with the *100% Canadian milk* attribute. The underlying theoretical constructs involved in the survey design are also discussed in this chapter. Chapter 4 explains the empirical model. The

following chapter presents the demographic and attitudinal results from both surveys. Chapter 6 presents and analyzes the results from the milk and ice cream estimations. The final chapter presents the conclusions, implications and limitations of the research.

Chapter 2: Consumer Preferences, Co-Branding and the Dairy Sector

This chapter provides an overview of the different factors believed to influence consumers' willingness to pay (WTP) by examining the consumer preference literature. In addition, this chapter discusses how co-branding can affect consumers' product perceptions and ultimately their WTP for products. Some examples of local and international co-brands with Canadian brands are also highlighted. In addition, an overview of the Canadian dairy industry is provided and trends in dairy consumption and domestic and international perceptions of Canada are discussed.

2.1. Review of the Consumer Preference Literature

A great number of studies address different aspects of consumers' WTP for various product attributes and products as a whole. Table 2.1 presents an overview of selected consumer preference studies and the various WTP techniques they employ. It is clear that WTP can be estimated for different attributes such as food safety, risk reduction, and healthy foods per se. The literature points to three main areas influencing consumers' WTP. These studies suggest that food attributes, risk perceptions, and consumers' values are the main factors contributing to preferences and WTP. The literature review highlights relevant studies with a focus on the impact of product attributes, risk perception and consumers' values and how these factors influence WTP.

Table 2.1: Selected Willingness to Pay Studies

Author (s)	Year	Place	Issue of Concern	WTP Technique	Findings
Shin, Kliebenstein, Hayes & Shogren	1992	US	WTP for safer food	Experimental auction	For each meal consumed, consumers expressed WTP 55 cents to eliminate Salmonella and 81 cents to eliminate Trichinella spiralis
Fox , Hayes & Kliebenstein	1994	California (Urban)	BST treated milk	Experimental auction	A large percentage of the participants (more than 50%) would not require a discount to purchase BST milk while a small group would pay a large premium to avoid drinking BST treated milk
Huang	1993	Georgia	Residue Free Produce	Mail Survey	Risk perception had a positive and significant effect on consumers' attitude towards pesticide use which in turn influence their WTP for residue free produce
Fox, Shogren, Hayes & Kliebenstein	1995	Four US Universities	WTP for Salmonella risk reductions	Experimental Auction	Participants expressed a general WTP a premium to reduce the risk of Salmonella. However, different groups expressed varying degrees of WTP
Halbrendt, Pesek, Parsons, & Linder	1995	US	Pork	Contingent Valuation	Respondents were willing to pay 16-23 cents more per pound for fresh pork with reduced levels of saturated fats
Wessels and Anderson	1995	Rhode Island	Seafood Safety Assurance (seafood fillet)	Contingent Valuation	Consumers had definitive preferences for alternative types of seafood safety assurances and were willing to pay a premium for seafood with these assurances
Bernard & Mathios	2005	Up-state New York	Milk (rbST-free and Organic)	Hedonic Price Method	Consumers were willing to pay more for both organic milk compared to conventionally produced milk
Hobbs, Bailey, & Dickinson	2005	Canada	Traceability and food safety assurance for beef and pork	Experimental Auction	Consumers expressed WTP more for traceability bundled with quality verification
Hobbs, Sanderson, & Haghiri	2006	Canada	Bison	Experimental Auction	There was no significant WTP for bison over beef with or without additional quality assurance

2.1.1 Product Attributes Affecting WTP

Lancaster (1966) notes that consumers derive utility from product attributes as opposed to directly from the product itself. Therefore consumers will likely decide to purchase milk, for example, because of the attributes embodied in milk such as: freshness, texture, taste, price, and brand, because consumers are particularly interested in the utility derived from a product's attributes rather than the product. Given the relationship between utility and product attributes, a method that economists use to measure a consumer's demand or preference is WTP. A demand curve depicts the link between the price of a product and the amount of it that consumers are willing and able to purchase at different prices. However, WTP is not just affected by affordability but also by an individual's taste and preferences and ultimately their quality perceptions. In line with the theory of Lancaster (1966), in assessing the quality of a product, each attribute is likely implicitly evaluated first, only after which the combination of all attributes is evaluated to formulate an overall perception of the product as a whole. The assessment of a product is however tempered by a consumer's subjective perception of "quality" and by extension which attributes constitutes a "quality" product.

Zeithaml (1988) offers a simple but broad definition of quality to mean "*superiority or excellence*" which by extension translates consumers' quality perceptions to mean "*consumers' judgment about a product's overall excellence or superiority"* (p.2). Consumers rely on various quality cues in evaluating the quality of a product, as such quality perceptions are based on consumers' evaluative judgments (Bredahl, 2004). Therefore, the definition of a "quality" attribute is quite dynamic with different attributes having varying levels of importance and signalling different information about quality depending on the product of interest and consumers' perceptions and personal preferences. For example, it was noted by Zeithaml that consumers' quality perceptions in the beverage industry are affected by what was termed as higher level abstract dimensions: purity, freshness flavor and appearance. Regardless of the product in question consumers' perceptions of the product are based on several product attributes which have been classified as credence, search, or experience attributes.

2.1.1.1 Search, Experience, and Credence Attributes

Given the importance of product attributes in influencing perceptions, preferences, and product demand, it is important to examine briefly the different categories of product attributes.

2.1.1.1.1 Search Attributes and Willingness to Pay

Search attributes are those that are verifiable at the point of purchase and as such a product can be evaluated by these attributes before a purchase decision is made. These attributes include product prices, labelling, package information and product appearance. Country of Origin (COO) information can also represent an important search attribute if the labelling is credible. The COO label represents an important attribute that is used by marketers as a differentiating product characteristic and a strategy to positively influence preferences and demand. According to Phau and Prendergast (2000) and Chen (2011), COO information and country image represent important attributes influencing WTP. Chen also notes that COO branding affects a product's image because it incorporates political, economic, technological and social factors associated with a specific country. Intuitively, these cues are incorporated in the value consumers place on a product and as such affect their resulting WTP.

Chen (2011) however clarifies that consumers do not perceive or judge the quality standards of all products from the same country equally. Therefore, although COOL in the capacity of a search attribute affects WTP, consumers' WTP also depend on other intrinsic and extrinsic product attributes individuals' characteristics.

Brand information, can also be classified as a search attribute, depending on how consumers use this information in their purchasing decisions. Zeithmal (1988) highlights the importance of brand information in influencing purchasing decisions by positing that a brand represents a summary of quality and provide consumers with bundled information relevant to the product in question. Also, Westgren (1999) notes that the success of a particular brand "Label Rouge" in the poultry industry in France could be attributed to the quality assurance that the brand offered consumers, this aided in eliciting WTP values exceeding 100% premiums for the Label Rouge brand in comparison to other brands.

2.1.1.1.2 Experience Attributes and Willingness to Pay

Experience attributes, unlike search attributes, cannot be verified before a purchase, this potential exists only after purchase. Like the name suggests, experience attributes entail attributes that are verified through consumption experiences. An experience attribute that readily comes to mind is taste (in the case of consumables). Experience attributes can therefore be thought of as attributes that guide or influence future purchase decisions through perceptions formed from experiencing product attributes and hence a product. Information on experience attributes can also be gleaned from other consumers based on a product's reputation. This is especially useful in cases when a product or a certain brand of product is being tried for the first time.

2.1.1.1.3 Credence Attributes and Willingness to Pay

Credence attributes are those which cannot be readily verified either before or after purchasing a product. Credence attributes are therefore often characterised by a claim such as "made in Canada", "organically grown", "grain fed", "locally grown", "fair trade" and "free range" and similar claims. The credibility of the organization making these claims is therefore very important since these attributes cannot be verified by the consumer either at the point of purchase or through consumption. Given that information asymmetry characterizes credence attributes, this anomaly is addressed through identifying the attributes through labelling, thus turning the credence attribute into a search attribute. Credence attributes can either be of an extrinsic nature such as COOL or organic practices, or intrinsic such as calorie content or type of ingredients. In any case, credence attributes may influence consumers' purchase intensions either negatively or positively.

Hobbs, Bailey, Dickinson and Haghiri (2005) evaluate WTP for credence attributes of beef and pork. In their study an experimental auction is employed to evaluate Canadian consumers WTP for assurances related to food safety, traceability, and production methods in beef and pork markets. The results indicated that consumers were inclined to pay more for traceability and food safety combined as opposed to traceability alone, neither of which is verifiable at point of purchase in the absence of credible labelling.

Peng, West and Wang (2006) also employed a stated preference experiment in the form of a survey to assess consumers' purchase intentions and attitudes towards conjugated linoleic acid (CLA) enhanced milk products given the claim that CLA could reduce the risk of cancer, cardiovascular diseases, diabetes, and obesity. Consumers in Alberta and British Columbia were interviewed via telephone, and there were 803 respondents in the final sample. The results were assessed with the use of an ordered probit model. The results indicated that consumers' preferences and attitudes toward CLA enhanced milk products were influenced by prior dietary related illnesses. Existing preferences for functional attributes, age and the presence of children in the household, among other factors, also affected preferences for this credence attribute.

Dentoni, Tonsor, Clantone and Peterson (2009) examine consumers' motivations for buying agri-food products that are locally grown based on the direct and indirect impacts of "locally grown" on consumers' purchase intentions. The authors defined the direct effects as those effects that impact purchase intentions without mediation, while indirect effects are defined as those that occur due to consumers' meditated belief that other attributes (whether credence or experience in nature) are present in the product. To test the differential effects, data was collected in 2008 from Michigan State University students through an internet survey focused on locally grown apples. A structural equation model was used to separate the direct and indirect effects. From the results it was concluded that consumers' belief in the presence of "locally grown" is influenced by both direct and indirect effects on their attitudes towards apples. In addition, it was noted that consumers' familiarity with apples had a negative impact on their beliefs in the presence of credence attributes as cues of other attributes, as more familiar respondents rely less on extrinsic clues than those that are not so familiar with the product.

In addition, a study conducted by Kuperis, Veeman, and Adamowicz (1999) highlights how product attributes affect consumers' perceptions and WTP. The authors examine consumers' responses to the potential use of Recombinant Bovine Somatotropin (rBST) in Canadian milk although this product attribute is not a component of Canadian milk. Data was collected from 294 respondents through a mail survey administered in Edmonton Alberta. A conditional logit model was used to analyze consumers' choices of milk comprising of varying levels and characteristics, namely, fat content, price, freshness and the presence of rBST. The change in

consumers' economic welfare resulting from the potential use of rBST was calculated based on how much consumers would have to be compensated to receive the same level of utility as before the introduction of rBST assuming that milk with rBST is explicitly labelled as such. The results indicated that the introduction of rBST milk in Canada can be expected to decrease consumers' welfare. However, it was also noted that the representative consumer was willing to make a trade-off between rBST and price as a decreasing price resulted in reduced welfare loss to the consumer but did not completely offset the welfare loss. The authors concluded that labelling can lead to negative perceptions. Therefore, if rBST was to be used in Canada the government and stakeholders in the dairy industry would need to educate consumers about rBST by providing accurate and clear information.

The preceding discussion on product attributes serves to highlight the importance of product attributes in consumers' assessment and evaluation of products and therefore their importance in influencing WTP. It can be noted that there exists a connection between these three groups of attributes. In some instances there is but a slight difference between a credence attribute and a search attribute as many search attributes are merely credence attributes that are transformed through labels or brands.

2.1.2 Risk Preferences and Perceptions

Based on the previous discussion, it is logical to deduce that product attributes are not the only factors affecting preferences and WTP. The manner in which product attributes are evaluated can be subjective and is often influenced by consumers' perceptions, and personal characteristics or preferences. Perceptions and personal characteristics affect preferences and consumers' perceptions of risk. Intuitively, the level of perceived risk is contingent on several factors such as the magnitude and probability of the potential risk (including but not limited to health and finances) associated with the product being purchased and therefore is inherently linked to product attributes. As such, it is expected that the higher the potential risk, the greater risk perception and hence aversion the purchaser will exhibit. Heslop and Sprott (2007) allude to the idea that a consumer's level of risk perception is most likely associated with differences in product type and price and suggest that more complex and expensive products would heighten risk aversion.

In evaluating the risk associated with product consumption the Canadian Partnership for Consumer Food Safety Education, estimates that there are approximately 11 million cases of foodborne illness in Canada every year, resulting in an estimated annual cost of 12 to 14 billion dollars (Canadian Partnership for Consumer Food Safety Education). Shin, Kliebenstein, Hayes and Shogren (1992) dissect the general cost associated with foodborne illnesses according to medical treatment, productivity loss, pain and suffering of affected individuals, food industry losses, and losses within the public health sector. Shin et al. (1992) also note that the stated financial cost however usually accounts only for direct individual losses incurred and is therefore understated. Consumers being aware of the potential costs will likely seek to eliminate or lower the associated risk to which they are exposed.

The level of risk tolerated is dependent on the individual in question. According to Weber and Milliman (1997), risk preferences can be likened to a continuum where they range from risk-avoiding to risk-seeking. However, a consumer's level of risk preference may vary from situation to situation as an individual's risk preference may also be influenced by their risk perception of the product in question inferred from existing product attribute(s). For example, it would be unlikely for consumers to knowingly purchase expired milk for the same price as milk within its expiry date regardless of where one falls on the continuum. However, if the expired milk is being sold at a discounted price then consumers with lower risk aversion may consider purchasing this product. Consequently, risk perception, directly and indirectly impacts WTP based on the potential risk associated with the product and the risk preference inherent within consumers. An assessment of WTP should therefore account for relative risk preferences.

In evaluating consumers' risk perceptions, Bernard and Mathios (2005) examine consumers' WTP for Recombinant Bovine Somatotropin (rBST) free and organic milk products using weekly scanner data in upstate New York. It was noted that there was an increase in organic milk purchases following the approval of rBST in the US - an indication of the relative risk aversion associated with consuming milk produced with the use of synthetic growth hormones. The results from their study indicate that consumers are willing to pay more for both rBST-free and organic milk compared to conventionally produced milk.

Similarly, Latvala (2010) examined beef consumers' WTP for increased quality information and whether they consider the information available on beef labels to be sufficient. Latvala also hypothesized that the value and willingness to pay for quality information increases with the risk a consumer associates with food products. Latvala surveyed 1,290 respondents, the data analysis conducted using a binary logistic model. The results indicate that consumers seek to reduce the risk that they are exposed to when making a purchase by using several risk reduction strategies, as a single source of information may not be sufficient. As such, contributing factors found to influence WTP included risk perception, other individuals' accounts of their experience, and trust in the food safety authority.

Risk perceptions may be quite different from actual risk. However, as it relates to WTP, risk perceptions trump actual risk. A study conducted by Hammitt (1993) explains this. In the study the author assessed consumers' WTP to avoid pesticide residues in conventionally and organically grown fruits and vegetables and posits that consumers may choose organic because they may perceive the risk reduction to be larger than it is objectively estimated to be. This argument therefore infers that although actual risk and perceived risk may be different, in reality WTP is affected by perceived risk. Also, different consumer groups will express different levels of risk perception based on the fact that heterogeneity is present among consumers. Wang, Halbrendt, Kolodinsky and Schmidt (1997) found that socio-economic factors were instrumental in influencing WTP for rBST free milk, as lower educated individuals were willing to pay less while those with higher incomes and those in urban areas expressed greater willingness to pay.
Tino and Klaus (2003) also examine the relationship between WTP and perceived risk. Their article analyzed consumers' WTP to avoid negatively perceived attributes (such as Genetically Modified Organisms (GMOs) and rBST). The findings suggest that consumers' perceptions of the healthiness of functional foods are associated with their perceptions of the nutritional qualities of the base product used in creating the final product. In essence, consumers' attitudes towards negatively perceived attributes such as GMOs and rBST will affect consumers' view of products with these attributes if they suspect the presence of these attributes, whether due to pure speculation or revealed undeclared absence of these attributes.

Based on the literature highlighted to reflect the relationship between risk perceptions and WTP, it can be concluded that there are many interrelated factors which influence consumers' risk perceptions and by extension WTP. Consumers therefore use different risk reduction strategies, whether that entails paying more for certain attributes or paying to avoid some attributes, or by seeking out additional information or avoiding some products all together. The likelihood of this type of risk reducing behaviour being observed varies with the risk preference of respondents.

2.1.3 Individuals' Values, Characteristics and Social Identity

In addition to the previous factors noted to influence consumers' WTP, it is also believed that consumers' values and characteristics are also major contributing factors in determining WTP. An individual's values can be associated with their level of patriotism or ethnocentrism. Values in this sense can influence consumers' preferences for different product attributes and particularly those associated with COO. Shimp and Sharma (1987) define ethnocentrism as a bias towards domestic goods as opposed to foreign goods. It is believed that consumers' domestic values may help to explain preferences for dairy products identified as being made from 100% Canadian milk, as indicated by the 100% Canadian milk symbol, because they identify with the symbol. Lantz and Loeb (1996) describe social identity as an individual's self-concept that is influenced by membership in a social group and the value and emotional significance the individual attaches to that membership. This section introduces some of the literature that indicates a link between consumers' values, perceptions and WTP and will focus on those studies surrounding the theme of patriotic or nationalistic values.

Given that the 100% Canadian milk symbol can be considered as COO information, the value that domestic consumers place on this attribute can be measured from this perspective. Patriotic consumers are expected to value the 100% Canadian milk symbol more than other consumers, given that patriotism can be defined as the positive sentiments and loyalty one feels towards a country (Stearns, Borna, & Oakenfull, 2003). The WTP literature discussed in this section suggests a possible connection between WTP, nationalism and social values. In this regard it is noted that it is often the case that consumers exhibit a distinct preference for domestic goods as opposed to foreign goods, and in some cases express a greater WTP for goods with domestic

attributes. This preference may be an indication of patriotism. However, Phau and Prendergast (2000) refer to this type of preference as "ethnocentrism".

Vassella, Fountain and Fountain (2010) distinguish and link ethnocentrism to patriotism by describing the former as having a significant effect on the manifestation of patriotic attitudes and purchase intentions. Similarly, Çakir (2008) explains the effect of ethnocentrism (which he defined as consumer beliefs "*about the appropriateness or morality of purchasing foreign-made products*" (p.4)) on patriotic behaviour. Therefore the purchase of foreign products may be seen as wrong (unpatriotic) if it is perceived to harm the domestic economy by having an adverse impact on employment or on the profitability of domestic firms. It is also noted that ethnocentrism will differ across brand and product category (Vassella, Fountain, & Fountain, 2010). Based on the preceding discussion, this research proposes that both terms can be viewed on a continuum where ethnocentrism is at an extreme end, while patriotism lies somewhere in the middle and un-patriotism lies at the other extreme[2]. Therefore ethnocentrism can be regarded as extreme patriotic tendencies resulting in rejection of anything that does not belong to or that is in direct support of given cultural and social values.

In an extensive report conducted by Heslop and Sprott (2007) (on behalf of Agriculture and Agri-Food Canada) to investigate issues surrounding domestic and local food choices, it was noted that there are several factors contributing to higher levels of domestic preferences. The authors specifically highlighted two contributing factors: a strong nationalism tendency by the general population, and a high degree of market openness. The noted preferences by consumers for domestic products can be viewed broadly as the impact of consumers' values on preferences or more narrowly as a dimension of patriotism or nationalism.

On a similar note, Chen (2011), while examining the effect of COO and consumer patriotism on brand strength, posits that as a result of consumers' patriotism, there is a tendency for consumers to have a higher evaluation of their own country's products than would foreign consumers. As

[2] In analyzing the results from this study no distinction will be made between ethnocentric consumers and patriotic consumers. Rather, there will be two groups-patriotic and indifferent consumers. Therefore extremely patriotic consumers (ethnocentric) will be classified only as patriotic consumers.

such, it would be expected that consumers' patriotism will have a negative effect on attitudes toward foreign products. Consumers having domestic preferences would therefore be more willing to purchase a domestic good over a foreign good if the prices were within the same range, in addition consumers with stronger preferences and higher incomes may even be inclined to pay more for a domestic COO attribute like the 100% Canadian milk symbol.

Stearns et al. (2003) also broached the subject of patriotic values as it relates to preferences and WTP for domestically produced goods as opposed to imported goods. The article discussed how marketers capitalize on patriotic sentiments to differentiate brands and alter customer loyalty. Specifically, it was noted that, after the September 11 2001 terrorist attacks in the United States (US), there was a noticeable increase in sensational advertising such as "*Made in the USA*" or "*Proudly made in the USA*". These adverts signal the role of patriotism in inducing willingness to purchase and by extension WTP. In addition, Loureiro and Umberger (2005) identify a general perception held by consumers that products originating in their home countries are of higher quality and also safer for consumption.

Froehlich, Carlberg and Ward (2009) examine Manitobans' WTP for brand name fresh beef products. The authors note in their WTP discussion that the desire for consumers to support their domestic economy results in consumers' general inclination to exhibit greater willingness to purchase domestic products as opposed to those that are imported. In support of this theory, Mahajan and Wind (2002) posit that purchasing decisions are influenced by emotions and that brands that appeal to consumers' emotions are more successful than brands that merely use brand quality and attributes to sell the product (as cited in Froehlich et al. (2009)). However it may be faulty to suggest that brand, quality and other attributes are less important to some consumers, since consumers may infer other quality cues such as product safety from COO information as well. In fact, Grebitus, Menapace and Bruhn (2011) suggest that consumers' assessment and use of cues is influenced by many factors including perceived risk and socio-demographic characteristics.

The preceding studies attempt to explain the general preferences exhibited towards domestic products and how they affect WTP. It is noted that WTP often depends on whether or not the

product in question was produced domestically or has domestic associations. In essence, factors affecting WTP can be summed up by noting the conclusions of Peng et al. (2006) in a study examining Canadian consumers' willingness to purchase Conjugated Linoleic Acid (CLA) fortified milk products. According to the study, factors which may affect consumers' purchasing decisions, attitudes and product acceptance include product quality, price (attributes) and consumers' socio-demographics (which includes social characteristics - risk perception and patriotism) or a combination of these factors.

2.1.4 A Review of Some Country of Origin (COO) Studies

In assessing consumers' preferences for COO labelling Loureiro and Umberger (2005) assessed consumers' WTP for mandatory COO labelling of beef, chicken and pork chops displaying the label "certified US", and the role of socio-demographics in determining WTP for these products. Responses obtained from 611 mail surveys in 2003 from US households were analyzed using both a binary logit and random effects logit models. The findings indicated that although consumers were concerned about food safety issues, WTP for COO labelling was very small but exceeded the expected implementation costs associated with mandatory labelling. It was also noted that socio-demographics was an important factor in determining WTP, as WTP was different across consumer groups.

Lantz and Leob (1996) employ conjoint analysis to assess the value consumers from Canada and the US place on domestic products as opposed to products from another country. Preferences were defined in the context of ethnocentrism which implies that consumers will place more value on goods from their country as opposed to goods from another country due to their strong national social identity. In this context, the COO effect was explained from two perspectives: where it is used as a quality cue (an additional credence attribute) and where it ignites a sense of nationalism. However, the general analysis primarily focused on the country bias effect where some consumers may feel the need to differentiate their group based on their social identity. The group of respondents comprised 74 Canadian and 114 US undergraduate students. Respondents were asked to choose between computer mouse pads from Canada, the US and Mexico. National social identity was assessed using the Consumer Ethnocentric Tendency Scale (Cetscale) which was first developed by Shimp and Sharma (1987). The results from both groups indicated a

strong COO effect in general. Furthermore, respondents with high ethnocentric tendencies were less price sensitive. It was therefore concluded that for "low involvement products" with the same prices, COO is important to all respondents. However, in a similar situation with higher prices, respondents who were more ethnocentric were willing to pay higher prices while less ethnocentric respondents were willing to switch to imported products.

Unterschultz, Quaragrainie, Veeman and Kim (1998) examine the importance of the COO of beef products on buyers in the Korean hotel industry (specifically executive chefs and purchasing managers). Perceptions and preferences for beef products from Canada, Australia and the US were assessed through the use of a stated preference methodology (interviews). Information was gathered from 43 respondents in 1995. The respondents were segmented into three groups: Korean chefs, non-Korean chefs and purchasing managers. The results indicated that the probability of choosing a beef product from US origin versus Canadian origin when the price and quality is exactly the same differed across groups of respondents. Results from the non-segmented model indicated that there is a 28% probability of a Canadian beef product being chosen as opposed to a 49% probability of a US product being selected. While the segmented model indicated that Korean chefs preferred Canadian beef products as opposed to non-Korean chefs and purchasing managers who exhibited a preference for US beef products. A comparison between Canadian and Australian beef products revealed there was a general preference for Canadian beef products. The segmented model however indicated that while Korean chefs and purchasing managers preferred Canadian beef products non-Korean chefs preferred Australian beef products. These results imply that different groups have different preferences towards the same products with an intended use to meet the same objectives. This is so because preferences are influenced by attributes such as COO based on consumers' perceptions. Particularly, preferences may have been influenced by the chef's experience with beef from different country of origin.

Another COO study was conducted on beef by Quagrainie, Unterschultz and Veeman (1998). In this study the authors sought to assess the effect of product attributes (origin information and bio-preservation in packaging) and individual characteristics on the probability of purchasing high quality beef cuts, high quality pork cuts and ground beef. Randomly selected households in

parts of western Canada (Alberta, Victoria, Winnipeg and Regina) were asked to complete a mail survey. Data from 530 respondents (from a total of 700) was used in the analysis. Estimation was conducted using the multinomial logit model. A combined model of the three products was estimated, as well as separate models for each product. The results indicated that the effect of "Alberta" was significantly stronger than the effect of "Canada" for high quality beef cuts. The authors attributed this to the positive image associated with Alberta beef suppliers. As for pork, the results indicated that consumers were indifferent to high quality pork cuts sourced in Canada and Alberta but preferred domestic pork to pork imported from the United States, while ground beef of Canadian origin was preferred to ground beef of Alberta origin. For the combined model, results indicated that products from Canada or Alberta are generally preferred to fresh meat products from the US or those without origin information. Respondents in general exhibited a negative response to the bio-preservation attribute. In addition, demographic characteristics such as age, family size and household income were noted to have an effect on a consumer's meat choice.

Volinskiy, Adamowicz, Veeman and Srivastava (2007) utilize an incentive based compatible Becker-Degroot-Marschak auction to estimate willingness to pay for Canola oil with either Canadian, US or no origin information explicitly labelled as either non-GM, GM or without GM information. An international market company recruited 247 respondents from Edmonton and the surrounding area. The experimental auctions were conducted at the University of Alberta between October and November 2005. At the beginning of the auction, respondents were endowed with a Canola oil with either a US or Canadian origin. Respondents were allowed to bid to exchange their endowed oil for either one other alternative or two alternatives in order to test for format effect. The results indicate that participants are willing to pay an additional $0.30-$0.50 per litre for Canola oil of Canadian origin relative to Canola oil imported from the US.

The preceding studies indicate the importance of the COO attribute in consumers' purchase decisions and willingness to pay; these studies indicate that consumers may be inclined to pay for the COO attribute for a variety of reasons. In general, it can be observed that COO is a very important attribute in influencing consumers' choices.

2.2. The Issue of Co-branding

This section incorporates co-branding into the discussion under the premise that in addition to being a COO label the 100% Canadian milk symbol represents a brand. The discussion commences with a simple definition of co-branding then the different types of co-branding are highlighted, followed by a discussion of perceptions toward co-branded products and the implication for products co-branded with the *100% Canadian milk* symbol.

2.2.1. What is Co-Branding

Co-branding is generally regarded as the combination of two or more brands to market a product or service (Leitch & Davenport, 2007). So what is a brand? While several definitions of a brand can be found in the literature (De Chernatony & Riley, 1998)[3], Chen (2011) adopts the definition of a brand from the American Marketing Association to mean *"a name, term, sign, symbol or design or combination of them, intended to identify the goods and services of one seller or group of sellers…."* (p.1). Hence meaningful insights can be garnered from the co-branding literature as Dairy Farmers of Canada uses the 100% Canadian milk symbol to identify and market dairy products. Co-branding can be effectively used to achieve different marketing objectives such as increasing sales in existing markets (market penetration) or facilitating the marketing of products in new markets (market development). Ultimately, the expected benefits of co-branding reside in promoting the marketability of products by creating a double appeal. A double appeal is created as each partner brand capitalizes on the other brand in an attempt to achieve immediate recognition and positive evaluation from potential customers (Chang, 2008).

2.2.2. Types of Co-Branding

Two main types of co-branding are described in the co-branding literature: vertical co-branding and horizontal co-branding. Vertical co-branding defines situations in which the producer of an input ingredient co-brands with a producer of a final product, for example a wheat company aligning with a bakery, or a hog farm with a restaurant. In the context of the current study, vertical co-branding is evident when 100% Canadian milk is used as an ingredient in ice cream

[3] Taking into consideration the plethora of definitions for "brand" These authors identified 12 main themes seen in the literature that they believe accurately describe a brand: 1) legal system,2) logo, 3) company, 4) shorthand, 5) risk reducer, 6) identity system, 7) image in consumers' mind, 8) value system , 9) personality, 10) relationship, 11) adding value, 12) evolving entity

(dairy farmers aligning with processors). Because this type of co-branding constitutes the use of an ingredient to complement a consumer product, it is also known as ingredient co-branding. On the other hand, there is also horizontal co-branding which exists when producers at the same production stage combine two or more brands into a single product (Helmig & Leeflang, 2008). An example of this would be Nike and Air Jordan or store brand milk with the 100% Canadian milk symbol. This thesis therefore examines the impact of both vertical and horizontal co-branding in the context of the Canadian dairy industry.

2.2.3. General Perceptions toward Co-Branded Products

Nunes, Dull, and Lynch (2003) advocate that co-branding is a tool that is becoming increasingly important in generating additional value as it helps to create awareness and build loyalty. Similarly, Mahajan and Wind (2002) suggest that brands that appeal to consumers' emotions rather than the "head" (logic) are likely to gain product positioning in the market. It is more likely for a brand that has gained product positioning to successfully achieve increased market share by co-branding with another brand. According to Mahajan and Wind, consumers who have an emotional link with a brand are less likely to be price sensitive so long as they continue to derive their emotional satisfaction from the brand.

Co-branding can either create value for a product or result in brand devaluation as it can either result in positive or negative brand perceptions. Specifically as it relates to this thesis, consumers may have a positive attitude towards products with the *100% Canadian milk* symbol in general. However, consumers' perceptions of milk or ice cream with the *100% Canadian milk* symbol may differ depending on the product brand with which it is associated. For example if a consumer dislikes store brand milk, co-branding that milk with *100% Canadian milk* symbol may change their perception of the final product.

As it relates to two or more different brand labels on a product, (for co-branding purposes) it is possible that in some cases quality cues (inferred from brand information) may be used as substitutes for one another. Therefore, consumers may not express greater WTP for a co-branded product if two strong brands combine (provided that the strength is an indication of how established a brand is and how well it is liked by consumers) because the overall perception of

the product may not change. On the other hand, it may be more beneficial for a weaker brand to co-brand with a strong brand as this may create added value from the perspective of the consumer and therefore greater WTP, as in the preceding example between store brand milk and the *100% Canadian milk* symbol. This thesis will show whether the *100% Canadian milk* symbol is a substitute for store brand or national brand labels. Also, the relationship between organic labels and the *100% Canadian milk* symbol will also be assessed.

Branding, and by extension co-branding, can result in beneficial marketing as it creates a means of product differentiation. In a study conducted by Innes, Kerr, and Hobbs (2008) assessing how marketers can use country branding as a means of product differentiation, clear distinction between a logo and a brand is also made. It was suggested that a brand entails more than just the physical attributes of a product, but more so its intrinsic characteristics such as reputation associated with the brand, as opposed to a logo which is just a physical label. It is therefore asserted that the demand for dairy products co-branded with the *100% Canadian milk* symbol will be affected by consumers' perceptions based on its intrinsic characteristics such as what the symbol signals to Canadian consumers. In this sense, the 100% Canadian milk symbol can be considered as more than a physical logo given that the presence of the symbol communicates additional information relating to country of origin and the production process of milk in dairy products. As such, it can be reasoned that the 100% Canadian milk symbol embodies elements of a brand; therefore relevant insights can be garnered from the co-branding literature.

2.2.4. Advantages and Disadvantages of Co-Branding

Both advantages and disadvantages flow from co-branding. As previously indicated, co-branding can either result in positive or negative perceptions. Helmig and Leeflang (2008) note a possible advantage with product co-branding in that it provides customers with a greater product assurance resulting in higher customer evaluation. This could imply that benefits resulting from co-branding are purely positive. However, it is also possible that co-branding can have negative implications. For example, while it can be theorized that combining the 100% Canadian milk symbol with another brand symbol creates positive customer evaluations for these products, it is also possible that negative brand perceptions can also be associated with the partner brand. A potential downfall could stem from the level of increased product uncertainty consumers develop

due to the brand alliance (Geylani, Ter Hofsted, & Inman, 2005). In addition, Nunes et al. (2003) posit that co-branding can suffer from "dilution" - which occurs when a brand loses its meaning to customers. Negative actions of a partner brand can also damage the reputation of the associated brand(s). On a positive note, co-branding may help to increase the customer base, thereby strengthening the competitive position that a products holds in the market.

2.3. International and Domestic Co-Brands with Canada

2.3.1 The Brand Canada Initiative

There is a general Canadian branding initiative that generically promotes Canadian foods and agricultural products both domestically and internationally (Agriculture and Agri-Food Canada, 2012b). The domestic branding initiative serves to assist both consumers and suppliers - domestic consumers benefit from being able to distinguish domestic retail products from imports, based on the premise that domestic consumers prefer domestic products to imports. Domestic producers and processors also benefit from this initiative through free membership that allows them to be more recognizable as Canadian. On the international front promotional campaigns are being undertaken in strategic priority markets such as Japan, Mexico and South Korea through advertising, in-store and restaurant promotions and foreign-language web-sites. Tools used in the branding process includes: taglines, graphics (such as the Canadian maple leaf), and brand promise (Agriculture and Agri-Food Canada, 2012a).

The international branding efforts help to identify Canadian ingredients in processed products and build recognition for Canadian brands in international markets by selling Canada's country image. International producer/processors can use the Canada brand graphics under certain conditions. According to Agriculture and Agri-food Canada the graphics can only be used if "the ingredient being promoted is 100 percent Canadian and is one of the first two ingredients listed on the product's label; or is a feature ingredient of the product; or is an iconic Canadian food or agriculture ingredient, (maple syrup, salmon, ice wine)" (Agriculture and Agri-Food Canada, 2012a). Agriculture and Agri-Food Canada also states that in order for international organizations to take advantage of the co-branding partnership a co-branding agreement must signed by a Canada Brand member who will be able to verify the provision of the Canadian ingredient and the non-Canadian co-branding partner using it.

Domestic companies using Canadian ingredients in their products have recognized that there is additional marketing advantage that can be derived by explicitly highlighting this information as a means of differentiating their products from those of imports. In seeking to capitalize on this branding strategy, some domestic organizations have even implemented marketing strategies on provincial levels for further differentiation. For example "Foodland Ontario" is a long standing provincial branding initiative that generically promotes the consumption of both fresh and processed Ontario agricultural products. More recent branding initiatives include "Wild Rose Meats", which markets Alberta's Bison both locally and internationally (Alberta Livestock and Meat Agency (ALMA), 2012) Since the aim of this study is to ascertain how domestic consumers respond to a Canadian COO attribute (domestic) on their dairy products, it is important to evaluate the current general perceptions held by domestic consumers about Canada and Canadian brands. The following section examines evidence from past studies.

2.1.1. Indicators of Domestic Perceptions

A 2005 survey conducted in Canada by Ipsos Reid, using 414 respondents entitled "What Do Customers Really Want", confirmed that health and safety have become particularly important to Canadian consumers. In addition 90% of the consumers surveyed expressed the belief that foods produced in Canada are safe. Canadian food is also associated with high quality which, according to the survey, is mainly associated with freshness, nutritional value and safety (Johnson, 2005).

In 2011 a survey of Canadian customers conducted by Agriculture and Agri-Food Canada found a high percentage of Canadian consumers have confidence in products made in Canada (96 percent) and viewed these as relatively superior. Interestingly though, a relatively smaller percentage (41 percent) of consumers responded that they would be willing to pay a premium for these products. In addition, 95 per cent of consumers were more willing to purchase locally produced goods, but of these consumers only 43 per cent indicated that they were willing to pay more. These WTP estimates were affected by consumers' personal association with agribusiness (suggesting that whether or not individuals were associated with the agriculture industry affected their WTP) (Agriculture and Agri-Food Canada, 2011).

As cited in Heslop and Sprott (2007), a study conducted by Heslop and Wall (1986) indicate that that some Canadian consumers expressed WTP a premium for domestic products. The respondents who expressed this willingness indicated that their decision was influenced by the advantage that this would provide for the Canadian economy, Canadian workers and that it was also driven by national pride. It is also noted that domestic bias is not unique to Canada but also evident in other countries.

In light of the previous discussion it is believed that domestic consumers will in general exhibit positive preferences towards products with the *100% Canadian milk* attribute. The preference magnitudes are however expected to vary based on consumer characteristics such as their levels of patriotism and risk perceptions. In addition, given that Canadian consumers expressed price sensitivity, it is also anticipated that WTP estimates will be conservative regardless of strong preferences for the Canadian brands.

In addition to domestic producers, international companies have also sought to capitalize on the general positive perceptions of Canada as a country and Canadian brands, by co-branding with various Canadian brands. A case in point: Yeo is a Malaysian company well known for producing a high quality soy drinks, this company sought to make the fact known that it uses 100% Canadian Soybeans to produce its soy drink. This company has signed a co-branding partnership agreement with the Canadian Soybean Exporters' Association allowing the use Canada brand graphics on its products to indicate that they are made from non-GMO Canadian Soybeans. (Yeo Hiap Seng, 2008) In addition, another company, Guchuan Food Company from China and Ecuador's Moderna Alimentos flour company both market co-branded products made from Canadian wheat under the Canadian Wheat Board co-branding program (Canadian Wheat Board (CWB), 2011)

In some cases, co-branding can be a beneficial strategy, but it depends on the specific product and the companies involved. As it relates to Canadian co-brands, it is noted that there is a general positive perception towards Canada as a country and that there are potential and realized benefits

in co-branding with Canadian brands both domestically and internationally. Although co-branding opportunities exist for Canada as a whole, it can be reasoned that the co-branding potential is particularly feasible in industries where Canadian products or ingredients have unique attributes in comparison to other competitors. With this being said the discussion now turns to the Canadian dairy industry which employs unique production and marketing practices relative to most other countries.

2.4. The Canadian Dairy Industry

The dairy industry dominates a large share of the agricultural sector in Canada and ranks third behind the grain and red meat sectors in terms of value of sales. Furthermore, it represents over 15% of the Canadian food and beverage sector with respect to sales (Canadian Dairy Information Centre (CDIC), 2012a). In the Canadian dairy sector, there are two markets for milk: the fluid milk market and the industrial milk market. The former includes table milk and fresh cream, while the latter speaks to the portion used to manufacture dairy products such as cheese, butter and ice cream. Milk supplied to the fluid milk market receives a higher return than milk supplied to the industrial market as industrial milk is derived from the excess of fluid milk.

The Canadian dairy industry has experienced several changes over the years, but still remains a strong sector. The dairy processing industry is highly concentrated and dominated by three companies that control (process) 80% of the fluid milk market and control 15% of the existing dairy plants (Canadian Dairy Information Centre (CDIC), 2012a). As of 2010, the Canadian dairy cattle population totaled approximately one million milking cows located on 12, 965[4] dairy farms, which reflects a 33% contraction in the number of farms over a 10 year period. Despite the reduction in the number of existing farms, this has not adversely affected production, perhaps due to advances in technology and genetics. Instead, supply has remained stable under the supply management system governing the industry. The contraction in the number of farms merely indicates greater concentration as existing farms get larger (Canadian Dairy Information Centre (CDIC), 2012a) Eighty-two percent of the dairy farms are located in Ontario and Quebec (Canadian Dairy Information Centre (CIDC), 2012c). Statistics made available from the CDIC

[4] See Appendix C for a breakdown.

shows that the fluid milk market (table milk and fresh cream) represents 39% of milk production, while the market for manufactured dairy products such as butter, cheese, yogurt and ice cream accounts for 61% of production (Dairy Farmers of Canada (DFCa)).

The dairy industry in Canada is supply managed. Supply management is based on three pillars: production management, import controls, and a pricing mechanism. Production management deals with the allotment of production quotas to producers, while import controls limit the quantity of dairy products imported. A pricing mechanism sets the price that producers receive for milk. Import controls that have been instituted lead to very limited imports, in 2012 total dairy imports valued approximately 5% of the value of the dairy industry (677 million versus 13.7 billion) (Canadian Dairy Information Centre (CDIC) 2012a; Canadian Dairy Information Centre (CDIC), 2013). Imported dairy constituents go directly into processed dairy products. As such, all milk (with the exception of chocolate milk) sold in Canada is 100% Canadian milk. With this being said, it might be intuitive to conclude that WTP for milk with the 100% Canadian milk symbol should be zero. However, this assumption can only be made on the premise that consumers have perfect information (all know and trust that all fluid milk sold in Canada is produced in Canada), and that factors affecting WTP are all known and observable. To ascertain whether consumers are fully informed, questions relating to "industry knowledge" were also included in the surveys that were administered. The results from these questions will help to determine if attitudes toward products with the 100% Canadian milk symbol as opposed to those without the symbol is partially driven by "lack of knowledge".

2.4.1 Trends in Dairy Product Consumption

Consumers are constantly updating their beliefs about desirable food attributes, which often translates into changes in demand based on consumers' taste and preferences. Peng et al. (2006) posit that consumer preferences for dairy products change with medical research findings and media exposure. In recent years, there has been a growing market for functional food products aimed at meeting the demand of "health conscious" consumers. Specific evidence of the emergence of functional products in the dairy industry can be seen in the form of probiotic yogurts, omega-3 products and organic milk products, to name a few. At the same time products that

were common among consumers such as 3.25%, 2% milk and ice cream have seen a falloff in demand (Dairy Farmers of Canada (DFCb)).

Information obtained from the CDIC website indicates that between 1992 to 2011 there has been a downward trend in the consumption of 3.25% and 2% fluid milk which declined by 36% in this period. On the other hand, the consumption of 1% and 0% milk increased by 55% in the same period. However, when all categories are taken into consideration, there has been a 19% decline in fluid milk consumption throughout the period. Ice cream consumption also declined by 56% over the same period. On the other hand, the consumption of yogurt has increased over the same period by 191% (Canadian Dairy Information Centre (CDIC), 2012a). The observed trends could perhaps be a result of the increasing demand for healthier alternatives. For example probiotic yogurts have been recently gaining in popularity and products are now widely available. Indeed, Agriculture and Agri-Food Canada attributes the shift in consumption patterns to consumers' increased awareness and health consciousness, with a shift toward dairy substitutes associated with health benefits such as soy milk and rice milk (Agriculture and Agri-Food Canada, 2009a). While milk has always been popular among consumers, these products are relatively new on the market. In addition, some consumers may have changed dietary patterns which could account for the decline in milk consumption, since some consumers may believe that these substitutes are healthier alternatives to conventional dairy products. Growth in the sales of this category may also reflect changing demographics and taste preferences.

2.5 Chapter Summary

This chapter has provided the ground work on which this thesis is based by first looking at some of the underlying factors influencing consumers' preferences and WTP. The three main contributing factors include product attributes, risk preferences and consumers' values. These attributes were subsequently discussed in the context of credence, search and experience attributes and the relationship between these attributes was highlighted. The concept of co-branding was also introduced and explored in the context of this study by positing how the 100% Canadian milk symbol relates to co-branding and the possible cost and benefits arising from co-branding. The Canadian dairy industry was also examined in the context of changing markets and consumer preferences. The chapter concluded with indications of how the country of origin

brand “Canada” is perceived. The following chapter will explore the theoretical framework and explain the research methodology used in assessing consumers’ preferences and WTP for the 100% Canadian milk symbol.

Chapter 3: The Theoretical Framework & Research Methodology

The chapter presents the theoretical framework on which this study is based. In addition, specifics relating to the research methodology employed and the survey design process are also discussed. Specifically, distinctions are also made between the types of data from which WTP values can be elicited. Decisions relevant to designing the survey are also discussed.

3.1. Conceptual Model

The research model and the analytical framework are founded on the premise that consumers' attitudes towards the *100% Canadian milk* symbol and their individual preferences and characteristics influence their purchase decisions towards dairy products with the symbol. Therefore based on the discussion in Chapter 2, a simple conceptual model is derived and presented in Figure (3.1). Figure (3.1) illustrates the interrelationship between the main areas noted as being influential in consumers' perceptions and WTP. The framework suggests that WTP is determined by: 1) product attributes and, 2) individual factors or characteristics. Peng et al. (2006) propose that factors influencing consumers' attitudes and acceptance of a new product may include product quality attributes, price, as well as consumer socio-demographics, and possible interactions between these factors. This study proposes that the same variables influence preferences for milk and ice cream with the *100% Canadian milk* attribute.

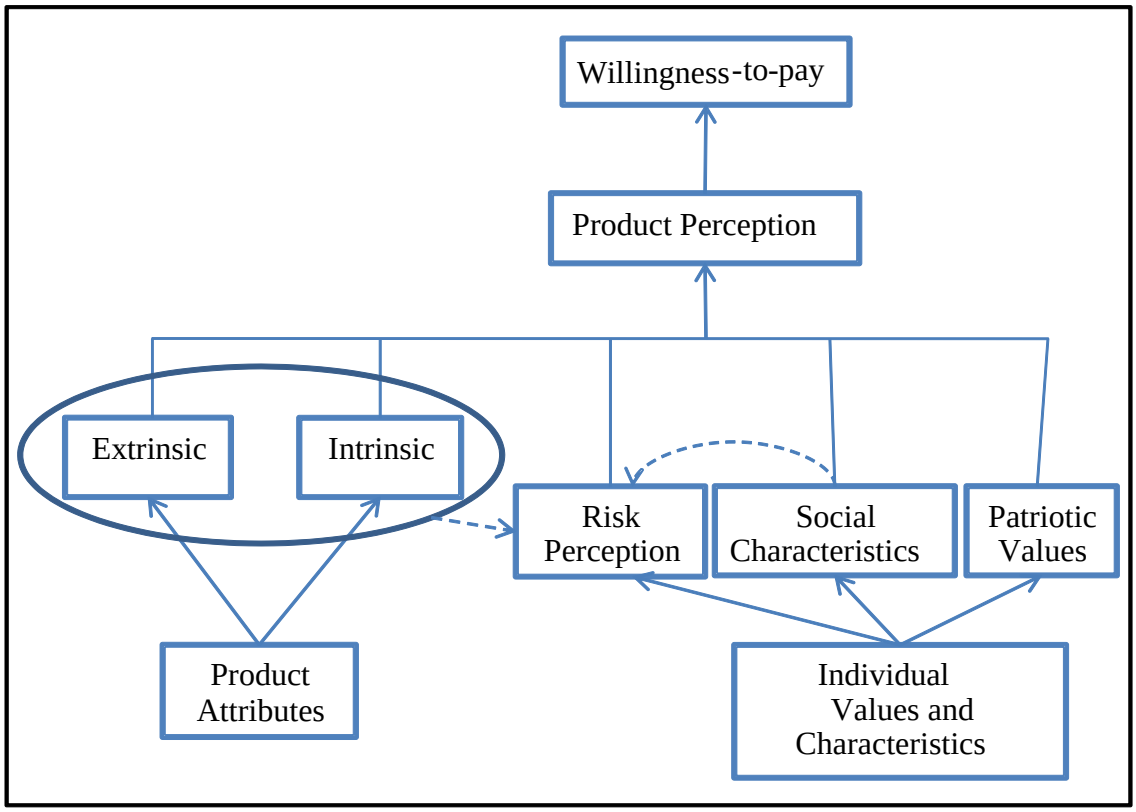

Figure 3.1: Conceptual Framework
Source: Created by author.

3.1.1. Product Attributes

In accordance with Lancaster (1966), consumers are hypothesized to derive utility from the attributes of the products they purchase and consume. Additionally, it is assumed that consumers make decisions based on utility maximization subject to their budget constraint. From this perspective, it can be deduced that product attributes influence perceptions and by extension determine WTP.

When dairy products are taken into consideration, several possible attributes may affect perceptions. These attributes may be important to consumers in varying degrees and in different combinations. Although some attributes may be considered more important than others, it can be reasoned that intuitively no single attribute will determine if a good is purchased even though the relative importance of a particular attribute may dominate. The combined attribute value must be higher than a minimum level acceptable to that individual. For example, a consumer who places

high value on the COO attribute, may be willing to pay a premium for goods from a specified origin, however, a deficiency in another attribute may lead to erosion in the expressed WTP for this particular product. Therefore it is expected that consumers will give preference to one product over another if the "value" of attribute combination is greater than that of other products.

As depicted in Figure 3.1, product attributes can be characterized as either intrinsic or extrinsic. Latvala (2010) distinguishes between extrinsic and intrinsic quality cues by defining the former as those associated with product but not an integral part of the physical product itself. Similarly, Zeithaml (1988) proposes that extrinsic cues are general (non-product specific) and can serve as indicators of quality across all types of products. Based on this distinction, cues related to origin, seals of approval, advertising and pricing information can be classified as extrinsic to the product in question. These cues merely offer a basis by which consumers gain information and can also assist in formulating perceptions of food safety. On the other hand, intrinsic cues are an integral part of the product. These may include taste and the generally functionality of the product. When consumers are unable (or unwilling) to invest time to infer intrinsic properties at the point of purchase they rely on extrinsic cues such as brand name and package to form quality perceptions inferred regarding intrinsic properties (Zeithaml, 1988). The *100% Canadian milk* attribute can be categorized as an extrinsic cue. Therefore, consumers purchasing a dairy product may infer something about a product with the symbol because of what the symbol signifies to them.

Consumers' perceptions of product attributes assist in their arrival at a final decision about what product to choose. In today's market, there exists a variety of products with small but significant distinctions such as brand, packaging and origin information. These differences can create value-added in the minds of consumers as they seek to maximize utility. The different preferences that exist for attributes suggest that consumers are heterogeneous by nature and this is exemplified in their choice behaviour. Therefore individual factors contribute significantly to attribute preference and, by extension, WTP.

3.1.2. Individual Factors

The conceptual model shows that there are several interrelated dimensions comprised in "individual factors" that impact preferences. These factors include: 1) an individual's level of

risk perception/ risk preference, 2) an individual's value system, and 3) social and economic factors (such as age group, education level, income level). Based on economic theory, an individual's taste and preferences are key factors influencing choice. Risk perception is also important in determining choice, and may be affected by an individual's socio-economic characteristics such as age, and education level (Wessells & Anderson, 1995) as well as product attributes including COO information (Lobb, 2006). As seen in Figure 3.1, and discussed in Chapter 2, both product attributes and individual factors act in concert to influence the perceptions of a product, which consequently determines consumers' WTP, ceteris paribus.

3.2. The Combination of Product Attributes and Individual Factors: Implications for WTP for Dairy Products Co-Branded with the *100% Canadian milk* Brand

In general, a product co-branded with the *100% Canadian milk* brand may be perceived as "better", as it could be thought of as creating added value to the final product from the perspective of the consumer. The source of added value could be as a result of consumers' views of the *100% Canadian milk* attribute given that this milk is marketed as fresh, safe to consume and hormone free. Under the assumption that these claims are true, products labelled as being made from 100% Canadian milk constitute potentially desirable attributes to Canadian consumers. According to Heslop and Sprott (2007), who summarized 17 studies previously conducted between 2001 and 2007, on Canadian attitudes and perceptions towards foods, freshness, safety and origin are some of the most desirable attributes to Canadians. These attributes represent the main characteristics used in promoting dairy products with the 100% Canadian milk symbol.

3.2.1. Food Safety Component

With food safety being a primary concern for consumers as a whole, Canadian consumers who purchase 100% Canadian milk products may have reason to believe that they are purchasing safer products. This is especially true for consumers that have confidence in the Canadian production system, believe in marketing claims and are particularly interested in Canadian brands.

The 100% Canadian milk branding initiative is anchored by programs such as "Canadian Quality Milk". This HACCP-based[5] on-farm food safety program was developed by the Dairy Farmers of Canada and is certified by the Canadian Food Inspection Agency (CFIA) (Canadian Dairy Information Centre (CDIC), 2012b). The "Quality milk program" primarily aims to keep track of a dairy farmer's actions to prevent and minimize the risk of exposing food to safety hazards. This process entails strict guidelines concerning quality and cleanliness- quality as it relates to the composition of the milk, and its maintained temperature and cleanliness as it relates to the general product surrounding including the animals. There are also guidelines in place for the transportation system and distribution of the milk (Dairy Goodness.ca). In light of these industry initiatives, incorporating the 100% Canadian milk symbol in a product's label could act as a risk reduction signal for consumers.

Though the 100% Canadian milk symbol unambiguously signifies that a product contains milk produced by Canadian farmers, the absence of this symbol could imply to consumers that the product is made from imported milk ingredients (Dairy Goodness.ca). If consumers are not interested in the 100% Canadian milk symbol as a risk reduction strategy the symbol may still appeal to consumers because of their values and beliefs surrounding origin information. Thus, products co-branded with the *100% Canadian milk* attribute may appeal to consumers who are patriotic and therefore have an innate desire to support domestic industries. An individual with this type of characteristic (patriotism) will experience increased utility from choosing a product with the *100% Canadian milk* symbol as opposed to choosing one without the symbol.

Based on the theoretical framework, in the context of the 100% Canadian milk symbol the following hypotheses are posited:

Health Hypothesis: Health conscious consumers will have a higher WTP for products with the *100% Canadian milk* symbol than respondents who are less health conscious.

Values Hypothesis: Respondents with high domestic values will be willing to pay a premium for ice cream and milk with the *100% Canadian milk* symbol

[5] Hazard Analysis and Critical Control Points.

Risk Hypothesis: Respondents who are relatively risk averse will have a greater WTP for products with the *100% Canadian milk* symbol.

3.3. The Impact of Preferences: Assessing Willingness to Pay

Based on the objectives of this thesis it is important to assess how consumers' preferences are affected when milk and ice cream are co-branded with the 100% Canadian milk symbol. By doing so, factors affecting WTP can also be assessed. WTP is a metric used to evaluate preferences. There are two approaches to gathering data used in estimating WTP: revealed or stated preference methodologies. Revealed preference data is derived from real life or market data and is based on actual purchases. Revealed preference data can be obtained from scanner information or market observation. On the other hand, stated preference data is obtained via survey questions (hypothetical questions) in which individuals are asked to imagine that they are choosing between competing alternatives whether different products or services (car, bus, train) or between a product differentiated by attributes (conventional, organic). Stated preference studies can also allow for an examination of hypothetical trade-offs between goods that do not currently exist in the market. Stated preference methods include survey data or data obtained from an auction experiment.

A stated choice approach in the form of survey data is used to assess WTP in this study. Obtaining actual purchase information would have proved more costly and time consuming. In addition, using the revealed preference method would have been potentially restrictive as it relates to obtaining information on attitudes, risk preferences, purchase habits and household characteristics and respondents' domestic values. The stated preference method proved the better alternative in this case as it better accommodates the research objectives. Specifically the discrete choice experiment applied in this thesis facilitates observation of respondent's choice between different attribute combinations. It also allows the unique assessment of attribute trade-offs at different prices and therefore an assessment of relative attribute values. For these, among other reasons the stated preference method is employed over the revealed preference method. The stated preference method approach involves a respondent's hypothetical decision to purchase milk and ice cream with or without the *100% Canadian milk* attribute.

3.3.1 Types of Stated Choice Approach

There are several stated preference methods that can be used to assess preferences for different product attributes and elicit WTP estimates: these include Contingent Valuation (CV), experimental auction, conjoint analysis and discrete choice experiments (a variant of conjoint analysis). Of these methods CV, conjoint analysis and discrete choice experiments appear to be most widely used. On the other hand, hedonic price and travel cost methods constitute revealed preference data.

The CV technique is appropriate for eliciting WTP measures for goods not traded in the market (non-market goods) such as natural resources (lakes, ponds, air quality) and nature in general (wildlife and forestry). This method employs a direct approach to eliciting WTP values, in that respondents are directly asked to indicate their WTP by stipulating a specific monetary value. On the other hand, respondents can also be asked how much they would be willing to accept to forego an existing resource or product attribute. In a similar way, experimental auctions elicit WTP values by mimicking real life market situations where buying and selling occurs and allowing respondents to bid for real items with real money to obtain their preferred attribute(s). Conjoint analysis and discrete choice experiments are however less direct in comparison to CV; with conjoint analysis, WTP estimates are deduced from respondents' indirect responses.

This study employs a discrete choice method in the form of a survey. The survey collects information on a range of issues which helps the analyst to better get to know the respondent as an individual and evaluate their personal preferences and attitudes. The questions used to assess willingness to pay are rather indirect, where respondents implicitly indicate their willingness to pay by trading between alternatives with varying attributes at different prices. The section of the survey geared towards assessing willingness to pay is known as a choice experiment.

There have been debates about the pros and cons associated with stated preference methods as opposed to revealed preference methods; see for example Adamowicz, Louviere, & William (1994) and Morikawa, Ben-Akiva & McFadden (2002). One major shortfall is noted with stated preference methods as opposed to revealed preference methods. Two major advantages of stated preference methods are also noted. The major disadvantage of stated preference methods stems

from the fact that respondents are presented with hypothetical questions and may answer differently than they would if they were faced with a real life situation - in that their choices are non-binding. This can create what is known as hypothetical bias. Manski (2000) however posits that a well-designed, survey can avoid many potential problems, therefore implying that the upside offsets the downside.

Despite the noted disadvantage of stated preference methods, one major advantage is evident from the fact that experiments are not limited to existing products and by extension product attributes. Therefore, experiments can be modified to accommodate as many attributes as deemed appropriate by the researcher, both for existing products and those that are not yet on the market. By incorporating product attributes that are already on the market, stated preference methods can be used to evaluate consumers' desired product improvements and assess their preferences for attribute modifications. Similarly, for products not yet on the market, stated preference methods can be used to test potential product acceptability, viability and success by evaluating consumers' openness to this new product. Another major advantage is that, unlike revealed preference data, stated preference data provides panel-like data in a single cross-section (Louviere, Hensher, & Swait, 2000) as it provides more observations from which consumers' preferences can be evaluated from one set of survey questions.

Another unique advantage of the stated preference technique is that it allows the analyst the flexibility of eliciting information regarding preferences for specific attributes of the good ("part worth" utility) in question as opposed to being limited to eliciting preferences for the good as a whole. Owing to this advantage, stated preference methods, and specifically discrete choice analysis, have been widely used to evaluate consumers' preferences for various product attributes. Several notable authors have employed this method in their work as seen in the literature review section.

3.4. Designing the Discrete Choice Experiment

In designing a stated preference survey, there are several factors that should be considered. These factors are discussed concurrently with how the surveys used in this research were designed.

This thesis employs a discrete choice experiment, which in essence, is a type of conjoint analysis representing a combination of conjoint analysis and discrete choice theory. The overall intent of discrete choice studies is to elicit consumers' preferences from choices that are made between different attributes or product alternatives from hypothetical scenarios. The structure of a discrete choice study is such that it comprises a set of hypothetical questions, each of which is composed of different alternatives representing different attribute combinations. Consumers' preferences are evaluated based on the trade-off between attribute levels among the different alternatives in each hypothetical scenario. An attribute level refers to a specific characteristic of an attribute, for example, the attribute "colour" could have levels such as blue, green, red, pink etc.

In this experiment, attributes and attribute levels are varied to present respondents with different treatment combinations (profiles/alternatives). The combination of two or more profiles is referred to as choice sets. In this thesis, each choice set is comprised of three profiles accompanied by a no-choice option, therefore each choice set is effectively comprised of four alternatives from which respondents choose. The questions included in the surveys were posed in a behavioural choice context "imagine that you are shopping for milk (ice cream) the alternatives below are the only ones available, select the one that you would choose". Respondents were allowed to choose only one of the existing alternatives and only then could they move on to another choice context that basically entailed similar alternatives. Respondents were unable to view or change a choice that was previously selected. Respondents were allowed to choose the no-choice alternative if they were dissatisfied with the available. In order to mitigate hypothetical bias respondent were briefed with a cheap talk script. This is generally used as a means of informing respondents that the analyst is aware of the possibility that they may not reflect their true preferences through their choices. Emphasis is placed on the importance of respondents' hypothetical choices being reflective of their true preferences.

3.4.1 Labelled versus Unlabelled Experiments

In general, stated choice experiments can be either labelled or unlabelled. A labelled choice experiment, as the name suggests, is comprised of alternatives distinguished by names or labels. For example, if one was interested in assessing consumers' preferences for different modes of transportation, the alternatives could be labelled as car, bus, train, plane, etc. Therefore, a

labelled choice experiment allows respondents to infer information that has been omitted from the included attributes but can be deduced from the alternative label. Unlabelled designs avoid this issue because they are comprised of alternatives where the alternative labels offer no meaning to the alternative itself, and therefore do not influence choice. In essence, each alternative is merely a combination of attribute levels and the respondents' choice of alternative is solely based on the combination of attribute levels offered. The label associated with the alternative offers no meaningful insight in the potential utility of the alternative itself. An example would be choice alternatives labelled as A, B, C and D from a four alternative choice experiment.

This thesis employs an unlabelled choice experiment. As indicated, the choice experiment consists of four attributes with attribute levels 2, 2, 2, 4 (as seen in Table 3.1) and four alternatives. The attributes and their levels were allowed to vary between alternatives except the alternative specific constant (ASC), which was specific to the fourth alternative and remained constant. The fourth alternative represented the "opt out" option included in the survey as "*I would not choose any*" which gave respondents the opportunity not to select any of the available combination of attribute levels (profiles). The fourth alternative represents a realistic option that consumers face on their shopping excursions as they are not obligated to make a purchase if they do not like the available alternatives. From an economic perspective, the ASC captures the average effect on utility of all factors that are not included in the model, similar to the constant used in a general regression model (Kjaer, 2005). Therefore, to avoid the dummy variable trap, the constant is excluded because of the inclusion of the ASC in the regression analysis.

The number of profiles in an unlabelled design can be represented by L^A. While that of a labelled design is represented by L^{MA}, where L represents the number of levels, A, the number of attributes and as it relates to the labelled design, M represents the number of alternatives. This study employs a design comprised of 32 choice sets. The choice sets were divided into four blocks of 8. Each respondent was assigned to one block. As far as possible, blocks were assigned to an equal number of respondents. Each respondent was given a total of eight choice sets to complete in order to reduce the risk of fatigue, which is expected to be positively correlated with the number of choices respondents make.

3.4.2 Description of Attributes, Attribute levels and Alternatives

Attribute selection is a very important aspect of survey design as the analyst needs to consider carefully the attributes of the product in question that may help to explain consumer choice behaviour. Four attributes were used, as shown in Table 3.1, namely: 1) Presence of the *100% Canadian milk* symbol, 2) Organic, 3) Brand, and 4) Price. It is believed that these are attributes that are evaluated in the selection of dairy products. Since this research considers consumers' preferences for milk and ice cream with the *100% Canadian milk* symbol, the *100% Canadian milk* attribute is particularly important.

Table 3.1: Description of Attributes and Attribute Levels

Attributes	Explanation
	The symbol is a seal of origin that guarantees the dairy products you are buying are made entirely from 100% Canadian milk or milk ingredients.
Type: Organic, Conventional	Milk labelled organic suggests that cows used to produce this milk have not been treated with hormones and that the milk contains no antibiotics. No such claims/suggestions are made with regards to conventional milk
Brand: National, Store	A National brand such as Chapman's and Breyers can be found throughout the country in all stores while store brands are only found in the affiliated store. For example, Safeway brands (only found in Safeway and affiliated stores) and President Choice brands only found in Canadian Super Store and affiliated stores.
Price ($) **Milk:** 2.83, 3.40, 4.60 and 5.52 **Ice Cream:** 4.56, 5.50, 6.40 and 7.50	National average price range for a 2-litre carton of milk (conventional and organic) or 2-litres of ice cream.

The second attribute -“Type”- has two levels: conventional and organic. This attribute is also expected to influence choice as it represents two different production methods. For consumers with an aversion to pesticides, chemicals, or additives, whether a product is organic may affect purchase intentions. Furthermore, Kuperis et al, (1999), Hammitt (1993), and Bech-Larsen and Grunert (2003) highlight the general importance of product type (organic) in consumers’ perceptions of consumption goods and how this attribute may affect WTP. The inclusion of the organic attribute provides the opportunity to evaluate the interaction between organic and 100% Canadian milk and between conventional and 100% Canadian milk and ascertain the effect on WTP.

Brand was also included as this search attribute is believed to be influential in the choice of products in general. Broadly speaking, a product can either be a national brand or a store brand; consumers with brand loyalty only purchase certain product brands. Therefore, “brand” may be pivotal to preferences for dairy products, as “brand” may represent an important attribute in explaining the choice of milk and ice cream. Zeithaml (1988) notes that consumers may use brand information to elicit quality cue information and thereby form quality perceptions.

The fourth attribute, price, can be considered as integral to all WTP studies as it facilitates the conversion of utility into a dollar value. Kjaer (2005) notes the importance of a cost attribute by highlighting that this attribute provides the basis for eliciting marginal WTP. With the inclusion of a cost attribute, the analyst is able to elicit WTP values for the good itself or for each included attribute; this is referred to as part worth or implicit price. Given that this research employs an unlabelled generic choice experience, emphasis is placed on WTP for individual attributes as opposed to individual alternatives. The price levels that were used reflect average retail prices in different provinces across Canada. Price data was obtained from the Canadian Dairy Information Centre (CDICa).

Tables 3.2a and 3.2b depict examples of the milk and ice cream choice questions as they appeared in the survey instrument. As can be seen, the only difference between the milk choice set and the ice cream choice set is the levels used for the price attribute, given that milk and ice

cream are sold at different prices. The design is the same as both surveys were constructed using the same number of attributes and attribute levels.

Table 3.2a: An Example of a Milk Choice Set

	Option A	Option B	Option C	I would not purchase any
Labelled:				
Type	ORGANIC	CONVENTIONAL	CONVENTIONAL	
Brand	STORE	NATIONAL	NATIONAL	
Price ($)	4.60	5.52	2.83	
I would choose...	☐	☑	☐	☐

Table 3.2b: An Example of an Ice Cream Choice Set

	Option A	Option B	Option C	I would not purchase any
Labelled:				
Type	ORGANIC	CONVENTIONAL	CONVENTIONAL	
Brand	STORE	NATIONAL	NATIONAL	
Price ($)	5.50	7.50	4.56	
I would choose...	☐	☑	☐	☐

Following So and Kuhfeld (1995) and Kuhfeld (2002), Statistical Analysis System (SAS) was used to determine the number of choice sets necessary to estimate the main effects and all two-way interactions given the number of attributes and their corresponding levels. Using the "% mktruns" macro it was determined that 32 choice sets would be feasible and sufficient to carry out the required estimation. However, 32 choice sets were considered to be cognitively burdensome for any one respondent to face along with other survey questions, therefore, the number of choice sets allotted to each individual was reduced. This reduction was made possible by systematically using the "% mktblocks" macro in SAS to divide the survey into blocks of eight in line with the recommendation made by Champ, Boyle, and Brown (2003) that a

reasonable number of choice sets for a respondent would be eight and at most 16. Therefore from a set of 32 choice sets each respondent was assigned to different blocks consisting of 8 questions.

3.5. Chapter Summary

Chapter 3 puts the conceptual model into perspective by examining how product attributes and individual factors act in concert to influence preferences and WTP. Based on the theoretical framework three hypotheses pertaining to consumers' preferences and WTP for the *100% Canadian milk* attribute were introduced. This chapter also discussed the different ways in which preferences are evaluated by examining different types of data: revealed and stated preference data. The main methodologies used to obtain stated preference data were also explored. Chapter 3 also discussed the design of the discrete choice experiment used in this thesis. The following chapter explains the empirical approach taken in evaluating preferences.

Chapter 4: Empirical Approach & Descriptive Statistics

This chapter introduces the foundation of discrete choice models and some of the different discrete choice models available for the estimation and analysis of discrete choice data. The benefits and potential drawbacks associated with each model are also discussed. In addition, this chapter provides information on the different types of WTP calculations.

4.1 The Foundation of Discrete Choice Models

Louviere et al. (2000) assert that there can be no valid measurement without theory, with that in mind it is important to explain the theoretical foundation on which discrete choice models are based. Discrete choice modelling is based on Random Utility Theory (RUT). RUT explains the basis on which consumer choice is made and why one alternative would be chosen in lieu of another. RUT stipulates that individuals are expected to choose the alternative with the greatest level of utility from a finite set of alternatives. The concept of RUT was first developed by Thurstone in 1927 (Louviere et al. 2008). RUT is used to create a link between observed consumer behaviour and economic theory by linking observed choices to assumptions made about consumer behavior (Kjaer, 2005) based on probabilistic theory or choice probabilities to create a random utility model.

4.1.1 The Random Utility Model

To account for both observed and unobserved factors affecting individuals' choices, a random utility model is comprised of two components, namely a systematic component and a random error component, where the systematic component is observable by the analyst (comprised of attributes and socio-demographic characteristics in choice modelling) and the random component is unobserved (preferences, perceptions and taste). The indirect utility associated with this model can be represented as U_{ni} which represents the utility that individual *n* derives from choosing alternative *i* from a set of alternatives. The systematic component is represented as V_{ni} and is a function of product attributes, and the random component is represented by ε_{ni}. In a choice modelling context where individuals choose between different alternatives, the model representing the choice of alternative *i* being chosen from a set of *j* alternatives can, according to Hensher, Rose and Green (2005), be represented as:

$$P_{ni} = Prob\ (U_{ni} > U_{nj}) = Prob\ (V_{ni} + \varepsilon_{ni}) > Prob\ (V_{nj} + \varepsilon_{nj}) \quad (1)$$

Where P_{ni} represents the probability that individual *n* selects alternative *i* which equates to the probability that the utility associated with alternative *i* is greater than the utility associated with all other competing alternatives. From equation (1) various discrete choice models can be derived. The model derived however depends on how the error component is assumed to be distributed. These models range from the simple restrictive Multinomial Logit (MNL) model to the more complex Mixed Multinomial logit model (MMNL). Some of the most common discrete choice models are introduced below.

4.2 Multinomial Logit Models: An Overview

The MNL[6] model is regarded as the base model used for discrete choice experiments (Hensher et al. 2005; Louviere et al. 2000; Kjær 2005) as it is simple when compared to more advanced choice models such as the Nested Logit (NL) and the Mixed Logit (MMNL) models. This model is based on the assumption that the stochastic error term follows a type-1 extreme value distribution and is independently and identically distributed (IID). The distribution is also known as Weibull, Gumbel and double exponential.

MNL is the generic name used to describe the generalized logit and the conditional logit models, but the generalized logit and the conditional logit models are technically different in that the former associates a choice among alternatives as a function of individual characteristics such as income, age and gender, while the latter associates the choice with product attributes of the selected alternative. However, intuitively, it is expected that a better estimation of choice selection probabilities will be approximated by combining both models since choice is generally a function of an individual's characteristics and also the attributes that the choice contains (Hensher et al. 2005).

Recall from equation (1) above that if the expected utility associated with alternative *i* is greater than that of alternative *j*, then the probability with which an individual *n* will choose alternative *i* will be greater than the probability associated with choosing *j*. This can be represented as,

[6] For a detailed derivation of the MNL see Chapter 3 of Louviere, Hensher & Swait (2000)

$$(P(V_{ni} + \varepsilon_{ni})) > (P(V_{nj} + \varepsilon_{nj})) \quad (2)$$

This implies that:

$$P_{ni} = P(V_{ni} - V_{nj}) > (\varepsilon_{nj} - \varepsilon_{ni}) \; for \; all \; j \neq i \quad (3)$$

In other words, equation (3) means that the probability of alternative *i* being chosen from a set of *j* alternatives would indicate that the difference in the utility from the systematic components of alternatives *i* and *j* is greater than the difference between the random component of both alternatives. Therefore the probability of selecting alternative *i* approaches one (1), while the probability of selecting alternative *j* approaches zero (0).

Since the researcher cannot observe the individual's true utility function, a probabilistic utility function is used in the estimation. Therefore, the probability that an individual *n* chooses alternative *i* can be represented as:

$$L_i = \frac{e^{V_i(\beta)}}{\sum_j e^{V_j(\beta)}} \quad (4)$$

Equation (4) represents the MNL model.

Although there are several statistical approaches that can be used to estimate the parameters in the utility expression of the MNL, estimation is usually done by maximum likelihood (ML). As such estimates are obtained by maximizing a probabilistic function with respect to the parameters or utility estimates (Hensher et al. 2005).

4.2.1 Potential Drawbacks with the Multinomial Logit Model (MNL)

Despite the computational simplicity noted with the MNL model, it is regarded as highly restrictive mainly because of its assumption of independence from irrelevant alternatives (IIA) and homogeneity in consumer preferences. The assumption of IIA implies that the ratio of choosing one alternative over another is unaffected by the presence or absence of any additional alternative in the choice set (Hensher et al. 2005). The IIA assumption therefore implies that the relative odds of two categories remain the same when an additional category is added, and the introduction of an additional category is thereby regarded as an irrelevant alternative. In essence this model is derived under the assumption that the unobserved factors are uncorrelated over alternatives and have the same variance for all alternatives (Train, 2009). The logit model therefore implies proportional substitution across alternatives. This assumption is unrealistic in

most cases and especially so in cases where the new alternative is a close substitute to an existing alternative hence resulting in correlation in the error terms.

Another simplifying assumption of the MNL is that respondents have homogenous preferences. This assumption implies that different individuals place the same value on product attributes. As such, this model does not represent random taste variation. Due to the preceding assumptions, the MNL model is seen as a rather basic, simplistic model for discrete choice analysis. Therefore more sophisticated extensions of this base model are often used to model choice behaviour especially when the objective is to capture heterogeneity in attribute preferences. If heterogeneity is indeed present in a model it must be captured in order to obtain reliable choice model predictions. In such an event, Train (2009) suggests using more sophisticated models such as Generalized Extreme Value (GEV) models such as the Nested Logit (NL), Heteroscedastic Extreme Value (HEV), the Multinomial Probit Model (MNP) or the Mixed Logit model (MMNL), which are generally less restrictive.

Each of the highlighted models is examined briefly to emphasize the major differences from the standard logit and to highlight how they improve upon the assumptions of the standard logit model to create less restrictive models with greater flexibility. However, before deciding to move to a less restrictive model it is important to first ensure that the MNL does not fit the data, this can be confirmed by employing the Hausman test (Hensher et al. 2005; Train, 2009).

4.2.2 Testing for IID violation

If IID is violated and the MNL is used, then at best this model will yield biased estimates of an incorrect model and at worst will yield results from which inferences made will be unreliable and invalid (Hensher et al. 2005). As an indication of IID violation the random component of different alternatives may reflect non-constant variances and alternatives may also share common unobserved attributes which results in non-zero off diagonal covariances. However, according to Hensher et al. MNL models are rarely appropriate for real life choice models as most problems involve violations of the IID assumption.

The Hausman test is used to verify the need for a less restrictive model in the case of IID violation where the MNL becomes inappropriate for estimation purposes. This is done through estimation of a restricted and an unrestricted model. The test statistic is given by:

$$q = [b_u - b_r]'[V_r - V_u]^{-1}[b_u - b_r]$$

Where u and r represent unrestricted and restricted models respectively, b represents the coefficient estimate while V represents an estimated variance matrix (Hensher et al. 20005).

4.3 Accounting for Consumer Heterogeneity in DCE

If it turns out that IID is violated (violation of the constant variance assumption which means that the missing sources of utility may have a different impact on the random component across alternatives) then a less restrictive specification of the choice model needs to be considered. Choice models permitting non-independence between alternatives such as the NL, MNP, and the MMNL adds realism to modelling choice behaviours (Train, 2009).

4.3.1 Generalized Extreme Value Models

Generalized Extreme Value (GEV) models represent a specific class of discrete choice models in which the unobserved component of utility follows a GEV distribution. GEV models accommodate a variety of substitution patterns as they allow for correlation over alternatives. This sub-section mainly focuses on the NL model.

4.3.1.1 Nested Logit

As previously mentioned, the NL model is a member of the general class of GEV models, in which the unobserved portion of utility for all alternatives is jointly distributed as GEV (Train, 2009). The GEV distribution can be represented as:

$$\exp\left(-\sum_{k=1}^{K}\left(\sum e^{-\varepsilon_{nj}/\lambda_k}\right)^{\lambda_k}\right) \qquad (5)$$

where ε_{nj} (unobserved utility) is correlated within nests but not across nests. The parameter λ_k represents the degree of independence in the unobserved portion of utility. When λ_k assumes a value of 1, the nested logit reverts to the MNL. A key distinguishing feature of the NL is that it partitions the choice set into nests which allow similar alternatives to share common unobserved components with one another within a nest (Hensher et al. 2005). Therefore, partitioning occurs between alternatives of similar or identical standard deviation. However, the overall variance of

the unobserved random component of all alternatives is constant within this model. The unobserved utility is correlated within a nest but uncorrelated across nests. The Nested Logit model is a more general random utility model that can accommodate various cross alternative substitution and is also consistent with the theory of utility maximization (Louviere et al. 2000).

Another feature of the NL model is that it implicitly assumes that individuals make decisions in a sequential manner. Therefore, if for example, there are two nests, A and B containing alternatives *i, j, k* and x, *y, z* respectively, then the probability of *i* can be expressed as:

$$P_i = Prob\ (nest\ A) * Prob(i|nest\ A) or\ P_A * P_{(i|A)} \quad (6)$$

And the utility associated with alternative *i* can be represented as:

$$U_{ij} = U_A + U_{(i|A)} \quad (7)$$

Therefore the random utility associated with alternative *i* is equal to the sum of a marginal utility (which results from being in a particular nest) and a conditional utility (which results from choosing a particular alternative within a given nest).

The general NL model is given by:

$$P_{ni} = \frac{e^{v_{ni/\lambda_k}\left(\sum_{j\in\beta_k} e^{v_{nj/\lambda_k}}\right)^{\lambda_k - 1}}}{\sum_{\ell=1}^{K}\left(\sum_{j=\beta_\ell} e^{v_{nj/\lambda_\ell}}\right)^{\lambda_\ell}} \quad (8)$$

Where β_k and β_ℓ represent two separate nests. When $\lambda_k = 1$, the NL reverts to the MNL as such the NL can be seen as a generalization of the standard logit.

The nested logit can also be represented as the product of two logits as portrayed in Train (2009), in which it is depicted as:

$$P_{ni} = P_{n\,\beta_k} * P_{ni|\beta_k} \quad (9)$$

Similar to the explanation provided above, the first term represents the probability of choosing nest β and the second term represents the probability of choosing alternative *i* given that the said nest was chosen. In logit form, the respective probabilities can be represented as:

$$P_{n\,\beta_k} = \frac{e^{W_{nk}+\lambda_k I_{nk}}}{\sum_{\ell=1}^{K} e^{W_{n\ell}+\lambda_\ell I_{n\ell}}} \quad (10)$$

$$P_{ni|\beta_k} = \frac{e^{Y_{ni/\lambda_k}}}{\sum_{j\in\beta_k} e^{Y_{nj/\lambda_k}}} \quad (11)$$

$$I_{nk} = \ln \sum_{j\in\beta_k} e^{Y_{nj/\lambda_k}} \quad (12)$$

Where W_{nk} represents variables which differ over a nest but not over alternatives and depends on variables that describe nest *k*. Therefore, this term represents the expected utility a person receives just from choosing nest β_k. On the other hand, Y_{nj} represents variables which vary over alternatives within nest k. In addition $\lambda_k I_{nk}$ denotes the expected utility received by respondent *n* from the choice among the alternatives in nest β_k and therefore represents the additional utility derived from being able to choose the best alternative in the nest. I_{nk} is also called the "log sum term" and λ_k the log sum coefficient (Train 2009). Therefore the combination W_{nk} and $\lambda_k I_{nk}$ provides the total expected utility derived from selecting an alternative from nest β_k.
The preceding discussion shows that the NL is applicable in situations where alternatives can be separated into distinct groups or nests due to correlation in the error terms.

4.3.2 Multinomial Probit Model

This method is not commonly used due to computational difficulties. The Multinomial Probit model (MNP) is based on the assumption that the unobserved factors are distributed jointly as opposed to independently (Train, 2009). Furthermore, unlike the other models that have been introduced in the preceding section, the MNP totally relaxes the IID assumption. Specifically the MNP model allows for random taste variation, it relaxes the IIA property, and it can be used in panel data when unobserved factors are correlated over time for each decision maker (Train 2009).

However, even though the MNP model is less restrictive than the MNL and the NL models, it is limited in its theoretical application as it dictates that the distribution of the random component of utility should be normal (Train 2009). This type of distribution is at times inappropriate depending on the attribute of interest. Train (2009) explains that a normal distribution would have a positive coefficient for price since it has density on both sides of zero, which would effectively imply that some persons have a positive price coefficient. A more appropriate distribution would be the lognormal distribution; however, this distribution cannot be accommodated by the MNP model.

4.3.3 Mixed Multinomial logit Approach

In light of the limitation of the MNP, a more general model can be applied. The Mixed Multinomial Logit (MMNL) model, also known as the random parameter logit (RPL), the kernel logit, hybrid logit among other terms, is considered the most general of all choice models. It relaxes all the assumptions that the MNP does and it is not limited to a normal distribution as it can assume any distribution specified by the analyst.

The MMNL assumes that parameters are randomly distributed in the population of respondents as opposed to being fixed as in the MNL model. The heterogeneity in the sample population can be captured through estimation of the mean and variance of the random parameter distribution (Champ et al. 2003). The MMNL model has some advantages over other discrete choice models since it provides the researcher with information pertaining to the interpretation of the unobserved part of utility, thereby providing unbiased estimates regardless of the presence of heterogeneity in the data (Kjaer, 2005).

The MMNL model is based on the assumption that the unobserved portion of utility consists of a part which follows any distribution specified by the researcher and a part which is IID extreme value. With this in mind, the unobserved factors can be decomposed into a part containing all correlation and heteroskedasticity and another part that is IID extreme value (Train 2009). As opposed to the former models (excluding the probit model) the MMNL incorporates random taste variations appropriately and fully (Train, 2009).

4.3.3.1 Specifications of the Mixed Multinomial Logit (MMNL) Model

The MMNL can be derived from more than one specification, namely the random coefficient specification and the error component specification. According to Train (2009) the random coefficient derivation is most widely used.

With the random coefficient specification, the systematic component of utility can be divided into two parts: an observable and an unobservable portion. The indirect utility can therefore be represented as:

$$U_{ni} = \beta_n x_{ni} + \varepsilon_{ni} \qquad (13)$$

Where the observed variables of the alternative and decision maker is represented by x_{ni}, and β_n is a vector of coefficients specific to individual n (it varies over individuals with density $f(\beta)$),

unlike the standard logit where the β coefficient is fixed. The random component is represented by ε_{nj} which is distributed IID extreme value (Train 2009). Based on this specification, the researcher observes only x_{ni} while β_n and ε_{ni} are unknown to the researcher but fully known by the decision maker. Equation (13) can therefore be expressed as:

$$U_{ni} = (\beta + \theta_n)x_{ni} + \varepsilon_{ni} \quad (14)$$

In equation (14) β represents the mean and θ_n represent the random term capturing the unobservable individual effects (therefore the standard deviation from the population mean). The probability of choosing alternative *i* can therefore be represented as:

$$P_{ni} = \frac{e^{\beta_n x_{ni}}}{\sum_j e^{\beta_n x_{nj}}} \quad (15)$$

Therefore, if θ_n is zero, then this would imply that β_n is fully known and the model would collapse into the general logit model depicted in equation (4). However, since β_n is unknown to the analyst, the MMNL (unconditional choice probability) depicted in equation (15) is therefore the integral of the standard logit over all possible variables of β_n (Train, 2009). This can be expressed as:

$$P_{ni} = \int L_{ni}(\beta)\, f(\beta)\, d\beta \quad (16)$$

Where:

$$L_{ni}(\beta) = \frac{e^{V_{ni}(\beta)}}{\sum_{j=1}^{J} e^{V_{nj}(\beta)}}$$

$f(\beta)$ is a density function and also called a mixing distribution- it can either be discrete or continuous.

Similarly to the standard logit $V_{ni}(\beta)$ represents the systematic component of utility. Assuming linearity in parameters $V_{ni}(\beta) = \beta' x_{ni}$ which results in the mixed logit being represented as:

$$P_{ni} = \int \left(\frac{e^{\beta' x_{ni}}}{\sum_{j=1}^{1} e^{\beta' x_{nj}}} \right) f(\beta) d\beta \quad (17)$$

4.3.3.2 Major Drawback of the MMNL

There are still some drawbacks with the MMNL, even though it is considered a more realistic approach than the MNL due to its ability to account for heterogeneity in the model. Firstly, estimation of the MMNL is more computationally demanding. In addition, the assumptions for individuals' preferences create difficultly as it relates to accurately determining the correct

specification of a parameter's heterogeneity. Furthermore, it is not possible for the MMNL to fully capture the source of individuals' preference heterogeneity.

4.3.3.3 Additional Approaches

The models introduced in the previous sections merely represent some of the approaches that can be applied to account for consumer heterogeneity. Champ et al. (2003) proposed two additional applications that can be used to compensate for the restrictions of the MNL: 1) The inclusion of interaction effects, and 2) estimation of a latent class model.

The inclusion of interaction effects speaks to the combination of product attributes with socio-demographic characteristics which are expected to add some heterogeneity to the model. The latent class approach assumes that the population of consumers can be divided into segments with different preference structures. Therefore, this approach applies to choice situations influenced by being in a particular segment of the population, that is, consumers within each class have similar preferences.

For the purpose of this research, the MNL logit model is employed both with and without interaction terms, as is the MMNL (referred to as the Random Parameter Logit (RPL) model henceforth). Estimating both models allows for cross comparisons and evaluation of how the results obtained from employing a simple model compare with those of a more advanced model.

4.4 Estimating Willingness to pay

An important aspect of choice modelling is ascertaining willingness to pay (WTP) estimates for product attributes. Both marginal and absolute WTP can be elicited from the discrete choice models: marginal WTP as it relates to a particular attribute and absolute WTP as it relates to a labelled alternative. In terms of this study, marginal WTP is of interest given that the alternatives are unlabelled and are merely representations of different attribute levels. Marginal WTP can be defined and estimated as the marginal change in price that is necessary to keep utility constant based on a marginal change in the attribute parameters. According to Lusk, Roosen and Fox (2003), because the attributes are effects coded WTP can be represented as:

$$WTP = {-2 * \beta_x}/{\beta_p} \qquad (18)$$

In equation (18), the numerator represents the attribute coefficient of interest which is derived through discrete choice methods estimation (Hensher et al. 2005).

The estimation of willingness to pay for interaction variables is slightly different as it takes into consideration the total effect of the attribute. Therefore to estimate WTP for an attribute all the relevant interaction terms must be taken into consideration. To accomplish this, WTP can be calculated as:

$$WTP = -2(\beta_x + \beta_D * D) \Big/ \beta_p \qquad (19)$$

Where β_x and β_p represent the attribute and price coefficient respectively, D represents a vector of demographic variables (for instance) being interacted with product attributes and β_D is the vector of coefficients resulting from the interactions.

Limdep 7.0, a non-linear statistical program, was used to conduct the estimation of the MNL and the RPL models that were introduced. The MNL and the RPL models outlined above are used to estimate the survey data on consumers' preferences for milk and ice cream with the *100% Canadian milk* attribute.

4.5 The Choice Model Specification

The previous section provided a basic overview of the different methods that can be used to estimate discrete choice experiments. In addition, eliciting willingness to pay estimates was also discussed. This section outlines the utility specification used in the discrete choice estimations.

Recall that the random utility model can be effectively represented by a systematic and a random error component. Given the attributes relevant to this study, the indirect utility function which represents consumer *i* choosing alternative *j* can be represented as:

$$U_{ij} = \beta_1 NoPurchase + e_j \qquad (20)$$

for the no purchase option represented by the fourth alternative in the choice sets. The "no purchase" option is a dummy variable, which equals 1 if the "no purchase" option is chosen and zero otherwise. In addition, the utility obtained from the other three alternatives can be specified generically as:

$$U_{ij} = (1 - NoPurchase) * (\beta_2 Can + \beta_3 Org + \beta_4 Nat + \beta_5 Price) + e_j \qquad (21)$$

The attributes included in equation (21) are: *100% Canadian Milk* (where the label is either present or absent), Type (conventional or organic), brand (national or store) and price. These attributes have been effects coded: The *100% Canadian milk* attribute is coded 1 if present and -1 if absent, Type" is coded 1 if organic and -1 represents the base level- "conventional", "Brand" is coded as 1 if it is a national brand and -1 for a store brand. The price attribute is continuous, and therefore prices are included in the utility function as they appear in the choice sets.

In addition to the main effects, it is expected that there will be two way interactions that are relevant to this study, as the presence of two attributes levels may have a different impact on preferences than the presence of one attribute level. The inclusion of main effects and all two way interactions in the estimation process is expected to account for most of, if not all, variation in the model. Based on the definition of interaction effect given by Hensher et al. (2005) an interaction exists between two variables if a consumer's preference for levels of one attribute is influenced by the level of another attribute. There are two attribute interactions that may be of interest to this study: the interaction of the *100% Canadian milk* attribute and organic/conventional and *100% Canadian milk* and store/national brand. These interactions are expected to influence consumers' preferences and choices of milk and ice cream.

The interaction between *100% Canadian milk* and organic for both the milk and ice cream choice models will show the effect of having an additional quality cue on conventional and organic milk or ice cream. The interaction between these two attributes may or may not reflect an increase in WTP. However, either way it will reflect how consumers perceive the combined attributes in milk and ice cream. In general, it is expected that consumers' preferences for the *100% Canadian milk* attribute may be influenced by whether or not the product is also labelled as conventional or organic. Consumers who exhibit preferences for organic products may already view "organic" as a quality cue. Should this be the case, combining milk or ice cream with the *100% Canadian milk* symbol may not represent added value to consumers and therefore result in no statistical difference in the WTP estimates for a product with one or both attributes. On the other hand, the presence of the *100% Canadian milk* symbol on conventional milk or ice cream

may positively impact consumers' preferences as the symbol may represent additional value added to these products if respondents view the *100% Canadian milk* attribute as a quality signal.

On a similar note, the interaction between *100% Canadian milk* and "national brand" will explain the effect of the combination of the *100% Canadian milk* symbol on a national brand as opposed to a store brand milk or ice cream. The *100% Canadian milk* attribute may be used to complement store brand milk or ice cream if consumers have good perceptions of the partner brand. On the other hand, such a combination could also result in a devaluation of the *100% milk* symbol if consumers overwhelmingly dislike store brands. The effect of co-branding (interacting) can be assessed by observing the main effects coefficients and the interaction of main effects and assessing whether the difference is statistically significant. To ascertain if the effects are statistically different the Wald test is employed (Hensher et al. 2005). These results are used to assess the impact of "co-branding" milk and ice cream with *the 100% Canadian milk* symbol.

The interactions noted above are particularly relevant to this thesis, as one of the main research interests is to ascertain how the *100% Canadian milk* symbol influences preferences and the choice of milk and ice cream. Therefore, by evaluating the two interactions noted, the effect of having the different levels of the *100% Canadian milk* symbol and type and the *100% Canadian milk* symbol and brand will become apparent. A model that captures the main effects and the two-way interactions of interest can be outlined as follows:

$$U_{ij} = (1 - NoPurchase) * (\beta_2 100\%Can + \beta_3 Org + \beta_4 Store + \beta_5 Price + \beta_6 Canorg + \beta_7 Canstore + e_j \quad (22)$$

Where the coefficient β_6 represents the interaction between the *100% Canadian milk* attribute and organic and β_7 represents the interaction between the *100% Canadian milk* attribute and brand.

In addition to attribute interactions, there can also be interactions between socio-economic variables and attributes. These interactions can further assist in explaining heterogeneity in preferences and perceptions; for example, how preferences for products with the *100% Canadian*

milk attribute differ between consumers of different age groups, income categories and educational levels. In addition, a key objective of this research is to ascertain the different target markets for dairy products by exploring how consumers with different socio-demographic characteristics respond to the *100% Canadian milk* symbol. Therefore, interactions between key socio-demographics and the *100% Canadian milk* symbol are also of interest.

Information on socio-demographics and values, (including preferences and attitudes) were captured from the general survey responses geared towards eliciting respondents' perceptions and beliefs (such as attitudes towards health, level of patriotism, risk perception and socio-demographic information). The general attitudinal variables are constructed from the survey responses regarding levels of patriotism, risk perceptions and health consciousness using factor analysis.

4.6 Chapter Summary

This chapter presented the empirical framework on which the thesis is based and introduced the different models used to estimate discrete choice data. In presenting the empirical framework, the Random Utility Theory has been explored; the chapter shows how this theory provides the framework for the various estimation methods used for discrete choice data. The Multinomial logit and the Random Parameter logit models which will be applied in Chapter 6 were introduced. The following chapter provides the descriptive statistics on the survey samples. Information relevant to respondents' attitudes and characteristics are also discussed.

Chapter 5 Descriptive Statistics

This chapter describes the processes that preceded the launching of the surveys and provides the descriptive statistics of the samples. Data on respondents' purchasing habits, brand awareness, brand preferences and general perceptions are discussed. The relative importance of different characteristics of milk and ice cream in influencing respondents' purchase intentions are also highlighted. This chapter also provides information relating to the factor analysis approach used to incorporate the attitudinal factors into the analysis of consumers' preferences.

5.1 The Survey: Development, Piloting and Administration

Before administering a survey, it is important to evaluate the instrument's overall effectiveness through pre-testing (Hensher et al. 2005). Taking this into consideration, both the milk and ice cream surveys were piloted in December 2011. The surveys were piloted to ascertain deficiencies in the instrument and to identify areas that could be modified such as clarity of questions and length of time to completion. Respondents were asked to time themselves and record this at the end of the survey. Based on the times reported, respondents took between 20-40 minutes to complete a survey.

It is most effective to have a representative pilot group to ensure feedback is received from a representative group of respondents. However, ensuring that a representative group was targeted presented some limitations as the pilot group primarily comprised of Saskatoon residents. However, respondents were targeted both from within and outside of the university setting. Respondents were asked to complete a survey that was collected later to allow greater convenience for respondents. These respondents were also requested to invite a friend or family member who purchases milk and (or) ice cream to complete a survey. Specifically, consumers of milk and ice cream were targeted and asked to manually complete one of (or both) the instruments in accordance to their purchasing profiles[7].

Responses from the pilot survey and feedback from thesis advisory committee members guided further modifications that were made to the survey instruments. Revised versions of the surveys

[7] Only persons who purchase milk were asked to complete the milk survey and only those who purchase ice cream and have done so within the last three months were asked to complete the ice cream survey.

were subsequently administered online in March 2012 by Insightrix, a market research firm. The complete version of the first block of the milk survey can be viewed in Appendix F.

The survey targeted Canadian dairy consumers and was administered nationwide in both French and English. Respondents therefore had the option of responding to either version based on their language preference. Prior to commencing the survey, potential respondents were briefed on what the survey was about and were given the option to consent to the terms or opt out of the survey. The survey was reviewed and received approval[8] from the University of Saskatchewan behavioral ethics review board. After respondents consented to complete the survey, screener questions were then asked to ensure that only milk and ice cream purchasers completed the instruments. This was necessary as the surveys primarily intended to obtain the views of persons who purchase milk or ice cream (depending on the survey), and those who purchase these products with a certain frequency. The instruments were almost identical except that one was geared towards evaluating the purchase habits and preferences for milk and the other examined ice cream.

The first section[9] of the surveys was geared towards assessing respondents' purchasing habits. Questions such as "do you consume dairy products and how often do you purchase milk/ice cream" were asked as screener questions. In assessing consumers' awareness and preferences toward the 100% Canadian milk symbol, consumers were explicitly asked if they were aware of the 100% Canadian milk symbol and to indicate on a scale of 1 to 5, with 5 being the most frequent how often they purchased milk or ice cream with certain labels. Next consumers' perceptions of milk and ice cream with the 100% Canadian milk symbol were assessed on a five point likert scale with higher values indicating negative perceptions. For example, respondents were asked if they would consider a product displaying the 100% Canadian milk symbol to be a quality product[10], while a choice of 1 would indicate that they strongly agree with this statement a choice of 5 indicates strong disagreement. In addition, the survey also sought to elicit

[8] Approval was granted on November 17 2011 (University of Saskatchewan Behavioural Ethics Board project #11-269).
[9] Appendices H and I provides descriptive statistics on the responses to the questions in each section of the milk and ice cream survey respectively.
[10] Question 1b in the section " Consumers' perceptions toward the 100% Canadian milk brand"

consumers' attitudes and views toward risk, primarily because more risk averse consumers may seek different risk reduction strategies and may consider dairy products with Canadian origin information as less risky. Views towards domestic values were also elicited with the intention of evaluating the relationship between consumers' domestic values and their preferences and attitudes toward dairy products with the 100% Canadian milk symbol. Therefore, respondents were asked to indicate their agreement with questions such as: "l always buy a domestic product over a foreign product if the prices are within the same range"[11]. These general survey questions were incorporated in the estimations after factor analysis was used to group similar questions into factors. Similar questions were combined to create factors representing health consciousness, domestic values and risk preferences. After responding to these preliminary questions respondents were introduced to the choice questions through the use of a cheap talk script. An example of the choice questions was also shown in a behavioural choice context as a way of explaining the ensuing choice section. Respondents were each assigned 8 choice questions. Following the hypothetical choices, respondents were asked industry knowledge questions. Those that responded incorrectly to the questions were asked if they would update their responses in the choice section given the correct response to the industry knowledge questions. The final section of the survey covered respondents' demographic characteristics.

5.1.2 Data Description

The survey targeted a representative population percentage from each province, which was based on the ratio of the population in each province to Canada's population (Table 5.1). A total of 510 respondents completed the milk survey while a total of 502 respondents completed the ice cream survey. Both data sets were cleaned for "straight liners" (respondents who selected the same answer for all 8 choice questions) and other responses which were cognitively inconsistent. Thereafter, there were 455 useable responses for the milk survey and 453 useable responses from the ice cream survey. The survey respondents were granted the option of answering an English or French version of the surveys. Of the number of responses to the milk survey, 44 were in French, 43 of those respondents were from Quebec. A total of 43 respondents to the ice cream survey

[11] Question 4 in the section "Patriotism/ Ethnocentrism"

completed the French version, 39 were from Quebec. Most of the Quebec-based respondents completed both surveys in English (57 and 49 respectively.)

As depicted in Table 5.1, the number of respondents from each province relative to the Canadian population is reasonably representative of the Canadian population by province (with the exception of the Territories, where at least one person should have responded to each instrument).

Table 5.2, Figure 5.1 and Figure 5.2 serve to compare demographics between the Canadian population and the survey samples. It can be observed from Table 5.2 that both survey samples provided a good representation by gender. However, a comparison of respondents' education levels indicate that, while almost 50% of the Canadian population (based on 2006 census data) the highest education attainment was at the high school level, a significantly smaller percentage of the milk and ice cream respondents were in this category with most respondents either having completed technical college or a bachelors degree.

Table 5.1: Percentage Population Represented by Province

Province	Population (%)	Ice Cream Sample (# of Completes)	Ice Cream Sample (% of Completes)	Milk Sample (# of Completes)	Milk Sample (% of Completes)
British Columbia	13.14%	71	15.67%	57	12.53%
Alberta	10.89%	49	10.82%	51	11.21%
Saskatchewan	3.09%	14	3.09%	11	2.42%
Manitoba	3.61%	17	3.75%	16	3.52%
Ontario	38.39%	180	39.74%	188	41.32%
Quebec	23.61%	88	19.43%	100	21.98%
Atlantic (NF,PEI, NS, NB)	6.95%	34	7.51%	32	7.03%
Territories/Yukon/Nun	0.32%	0	0.00%	0	0.00

Source: Created by author using 2011 census data (Statistics Canada, 2012) and total survey respondents.

Table 5.2: Comparative Demographic Characteristics

Comparative Demographic Characteristics			
	Milk Sample	Ice Cream Sample	Canadian Population
Gender			
Male	47.91%	43.93%	49.17%
Female	52.09%	56.07%	50.83%
Education			
Less than high School	25.71%	27.59%	
Completed High School			49.3%
Some Technical College	34.95%	32.89%	
Completed Technical College			28.1%
Some University	32.75%	31.35%	
Bachelors			16.6%
Graduate Degree	6.59%	8.17%	6.0%

Based on 2006 census data (Statistics Canada, 2011)

Figure 5.1 provides a comparison of the age distribution in the survey samples with the Canadian population. Most of the survey respondents were well represented in the different age groups. It should be noted, however, that the purchase of milk and ice cream products is not necessarily expected to closely match the age distribution of the Canadian population. As for income, a greater percentage of survey respondents were earning a household income of $45,000 and more in comparison to the Canadian population. On the other hand, respondents earning $25,000 or less were under represented in comparison to the Canadian population.

In general, it can be concluded that respondents for both the milk and ice cream surveys have higher income, and are more educated than the typical Canadian. These anomalies are typically seen in internet based surveys as confirmed by Hu, Adamowicz, and Veeman, (2006). As it relates to this study these potential sources of bias are not major concerns as subsequent analysis revealed that income and education were not significant[12] in influencing preferences for milk and ice cream with the *100% Canadian milk* attribute.

[12] Education was marginally significant in the milk model

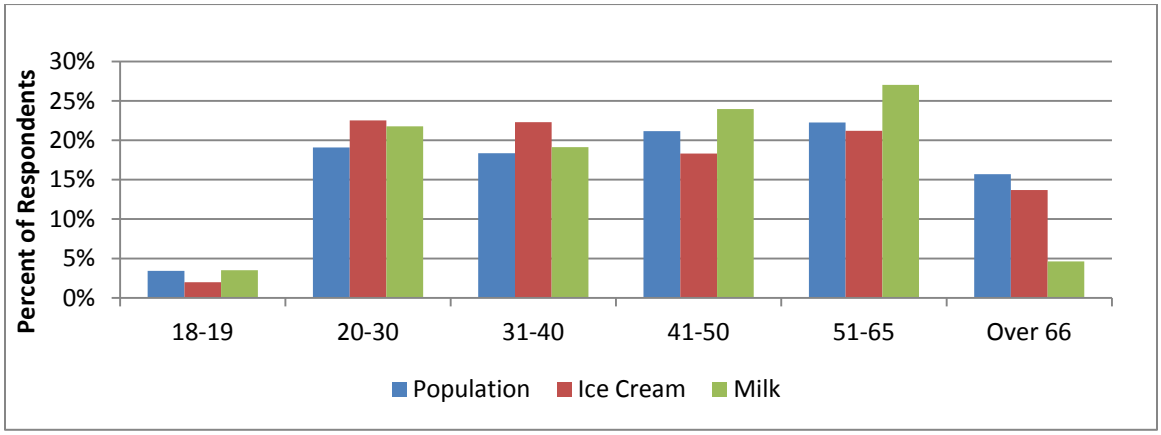

Figure 5.1: Age Distribution

Source: Created by author using 2006 census data (Statistics Canada 2012) and survey data. The number of respondents for the milk and ice cream surveys is 455 and 453, respectively.

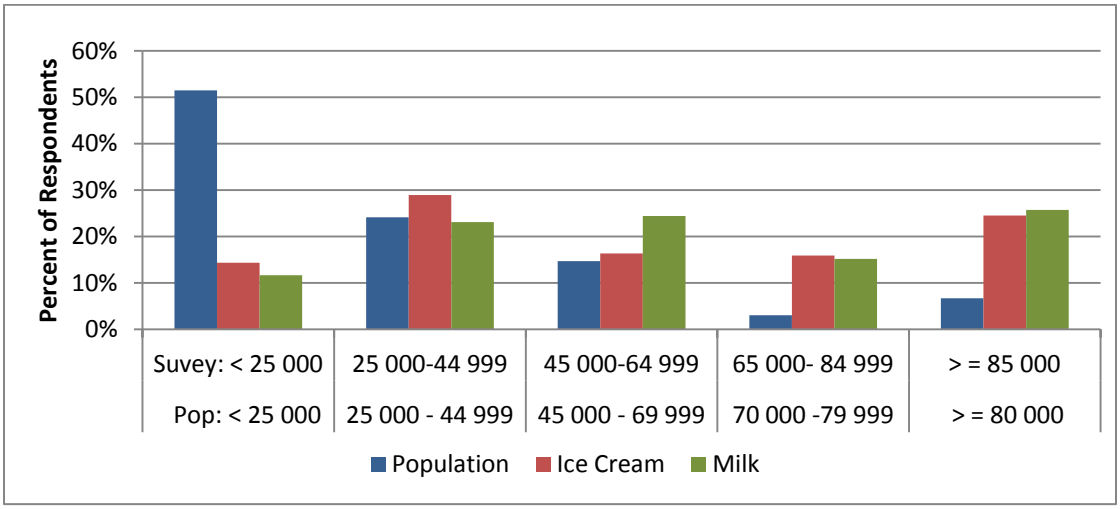

Figure 5.2: Income Distribution

Source: Created by author using 2006 census (Statistics Canada, 2006) data and survey data. The number of respondents for the milk and ice cream surveys is 455 and 453, respectively.

5.1.3 Purchasing Habits

In order to ascertain respondents' purchasing habits, respondents were asked to indicate how frequently they usually purchase milk in a month and ice cream in a three month period, and the amount most frequently purchased per period[13]. Respondents were allowed to choose between

[13] Questions 2 and 3 respectively under the "Purchasing Habits" section

four sizes and four frequencies. The responses to the milk survey indicate that most respondents purchase 4-litre containers of milk more than four times per month as seen in Figure 5.3. Most ice cream respondents purchase 1-litre containers of ice cream once and twice per three month period as indicated in Figure 5.4. From respondents' purchasing habits, it can be observed that, as expected, milk is consumed more frequently and in greater quantities than ice cream.

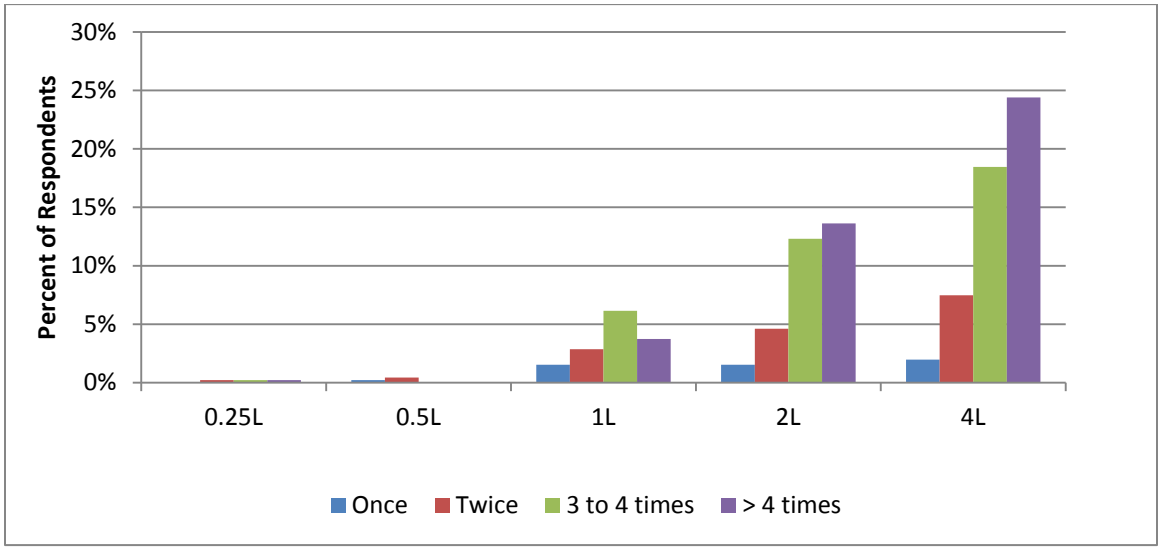

Figure 5.3: The Frequency of Canadian Consumers Milk Purchase per Month
Source: Created by author using survey data. Number of respondents = 455.

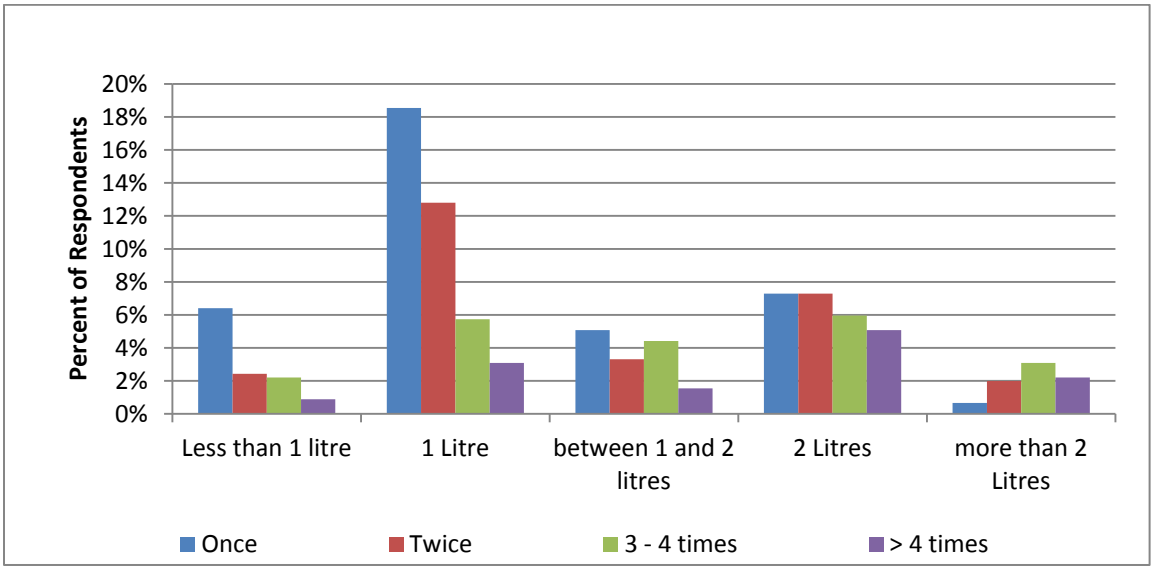

Figure 5.4: The Frequency of Canadian Consumers Ice Cream Purchase per Three Month Period
Source: Created by author using survey data. Number of respondents = 453.

5.1.4 Respondents' Brand Awareness, Brand Perceptions, Level of Patriotism, Attribute Preferences and Industry Awareness

In addition to ascertaining respondents' demographic characteristics, several attitudinal questions were also included in the surveys to facilitate the analysis of consumers' awareness and perceptions towards milk and ice cream with the *100% Canadian milk* symbol. In addition, questions relevant to evaluating consumers' values and preferences for different attributes of milk and ice cream were included. Questions geared towards assessing respondents' attitudes toward healthy living and risk preferences were included in the surveys. In addition, respondents were also required to answer industry knowledge questions. These questions strategically followed the discrete choice experiment section so as to determine if and how knowledge or industry awareness had influenced choices. Some of the results analyzed from these questions are presented below.

5.1.4.1 Brand Awareness

To ascertain consumers' brand awareness respondents were explicitly asked ***"Are you aware of the 100% Canadian milk Brand"***[14] **.** Based on the responses to this question, it is evident that most respondents were aware of the *100% Canadian milk* brand as depicted in Figure 5.5. Figure 5.5 indicates that approximately 94% of respondents to the milk survey were aware of the *100% Canadian milk* brand. The awareness of respondents to the ice cream survey is comparable with approximately 91% of respondents indicating brand awareness (see Figure 5.6). The high percentage of respondents indicating their awareness could be a function of agreement bias, and therefore should be treated with caution.

[14] Based on question 1 in the "Awareness and Brand Preference" section of the survey

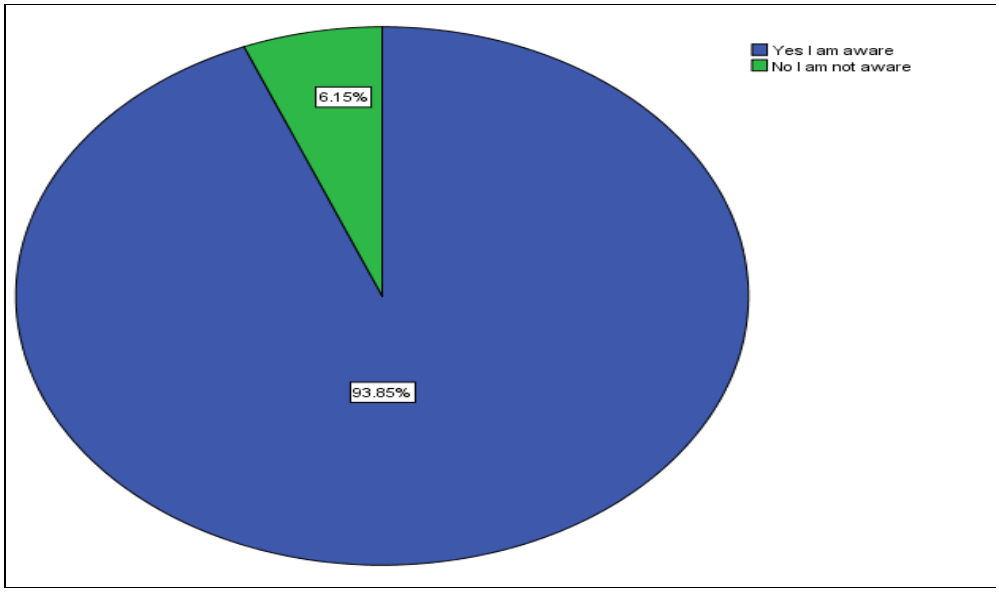

Figure 5.5: Brand Awareness- Milk Respondents
Source: Created by author using survey data. Number of respondents = 455.

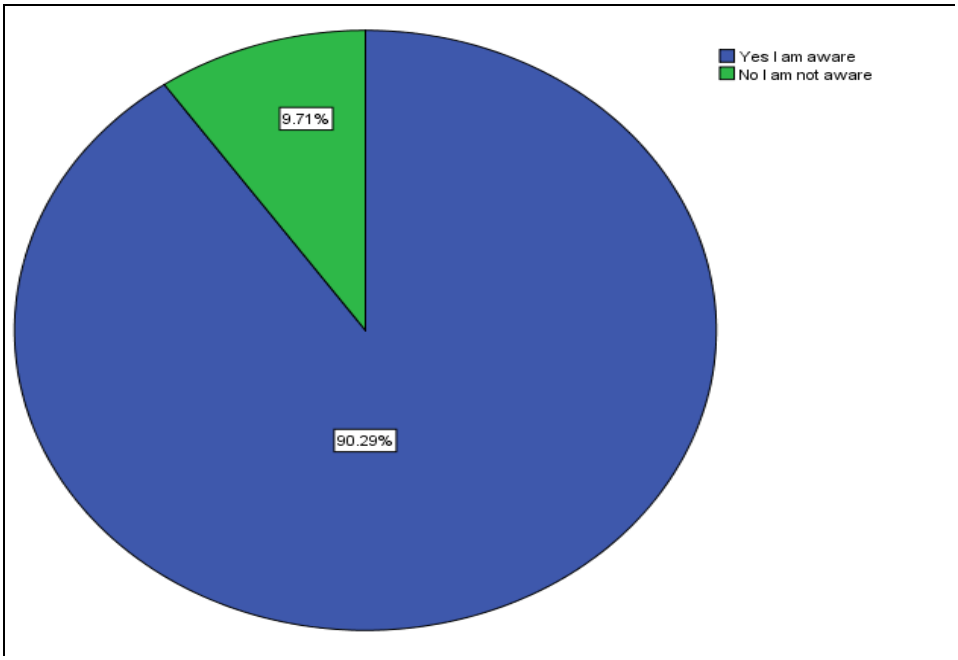

Figure 5.6: Brand Awareness- Ice Cream Respondents
Source: Created by author using survey data. Number of respondents = 453.

5.1.4.2 Brand Perception

Several questions were geared towards assessing respondents' attitudes towards dairy products with the *100% Canadian milk* symbol. As an example, respondents were queried as to whether

they perceive products with the *100% Canadian milk* symbol to be of superior quality in comparison to products without the symbol. The perceptions of respondents who indicated that they were already familiar with the symbol were of particular interest. Figure 5.7 depicts this information and indicates that over 38% of respondents to the milk survey "strongly agree" that products displaying the *100% Canadian milk* symbol indicate higher quality as opposed to similar products without the symbol. Similarly, 36% of respondents somewhat agreed with the statement and 24% indicated that the quality was about the same and as such signal an indifference towards the *100% Canadian milk* symbol. Only 2% of respondents explicitly disagreed that products with the symbol were of higher quality than products without the symbol. This suggests somewhat mixed perceptions toward milk and ice cream with the symbol although most respondents appear to have positive perceptions.

Figure 5.8 depicts respondents' attitudes towards the symbol, (similar to 5.7) but based on respondents' location. It can be observed that a relatively high percentage of respondents from Ontario and Atlantic Canada and Quebec view products with the Canadian symbol to be of higher quality than products without the symbol. On the other hand, respondents from the Prairies indicated a high level of indifference towards products with the symbol, with approximately 37% percent of respondents believing quality to be about the same. Overall, the findings suggest some heterogeneity in respondents' perceptions across the different regions in Canada.

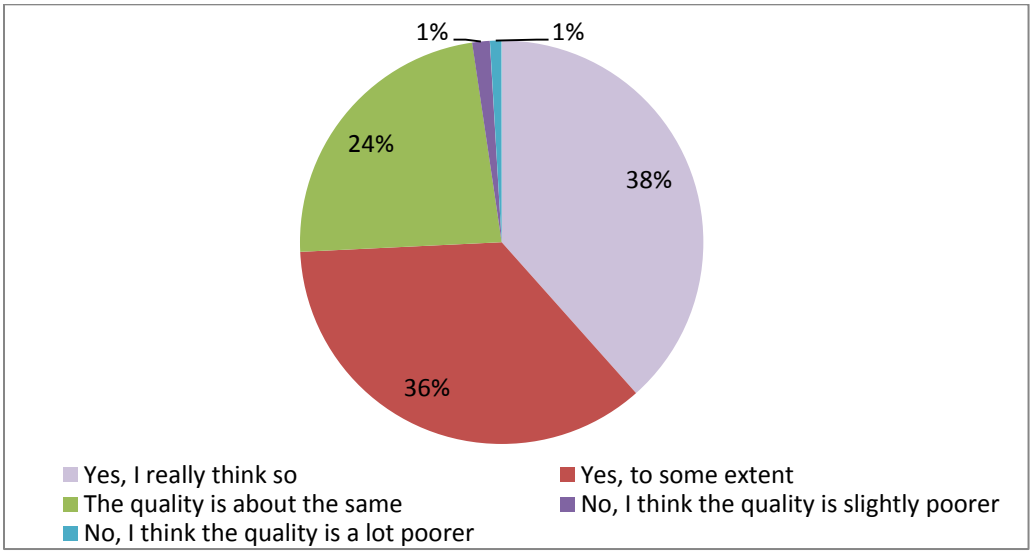

Figure 5.7: 100% Canadian Milk Symbol as an Indication of Higher Quality- Milk Respondents

Source: Created by author using survey data[15]. Number of respondents = 455.

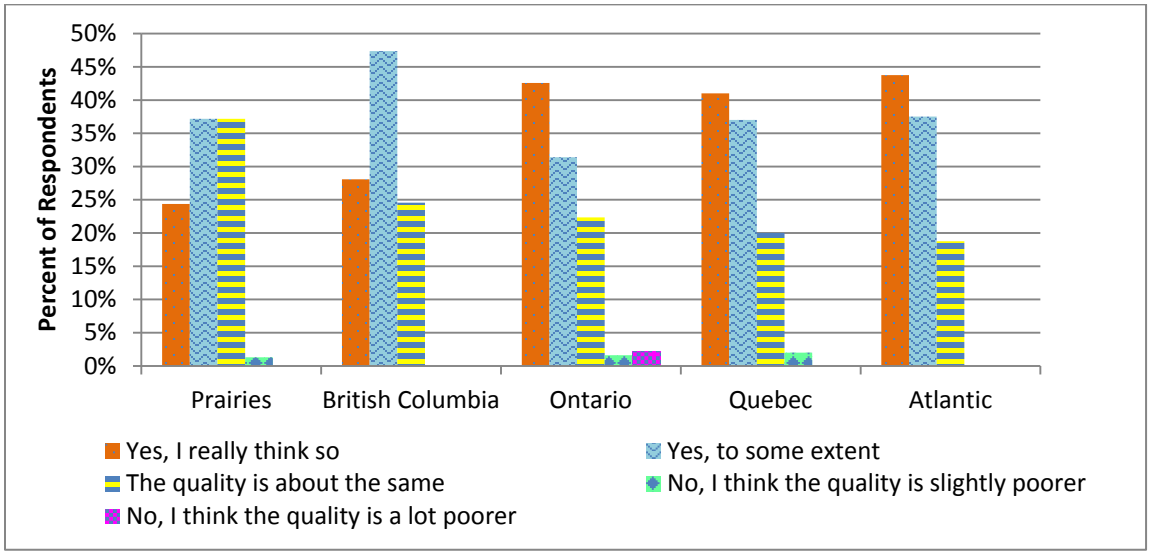

Figure 5.8: The 100% Canadian Milk as an Indication of Higher Quality by Location - Milk Respondents

Source: Created by author using survey data. Number of respondents = 455.

The perceptions of respondents to the ice cream survey were also assessed. Figures 5.9 and 5.10 depict whether ice cream respondents consider products with the *100% Canadian milk* symbol to be of higher quality. While 32% of respondents view products with the *100% Canadian milk* symbol to be of higher quality, 25% of respondents were indifferent. Atlantic Canada had the highest percentage of respondents who indicated that the symbol is an indication of higher quality. However, a high percentage of respondents from Atlantic Canada also indicated their indifference towards products with the symbol, in addition, to respondents from the Prairies and Quebec (See Figure 5.10).

[15] Based on question 2(b) in the section " Consumers' Perceptions toward the 100% Canadian milk Brand" -On a scale of 1 to 5, please rate your agreement with the following statements "In comparison to milk products **without** the 100% Canadian milk logo, I consider **milk with the 100% Canadian milk logo to be**: Of higher quality.

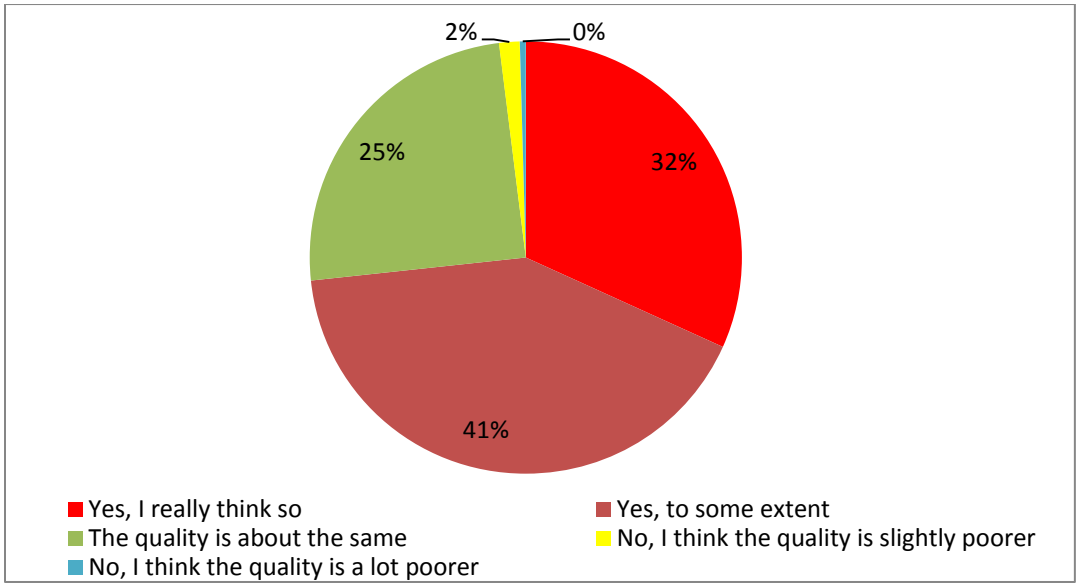

Figure 5.9: The 100% Canadian Milk Symbol as an Indication of Higher Quality- Ice Cream Respondents

Source: Created by author using survey data. Number of respondents = 453.

It can be inferred from the preceding sub-sections that respondents are mostly aware of the *100% Canadian milk* symbol. It can also be concluded that respondents from both survey instruments have somewhat mixed perceptions towards products with the *100% Canadian milk* symbol, although a relatively high percentage of respondents from Ontario and Atlantic Canada indicated positive perceptions.

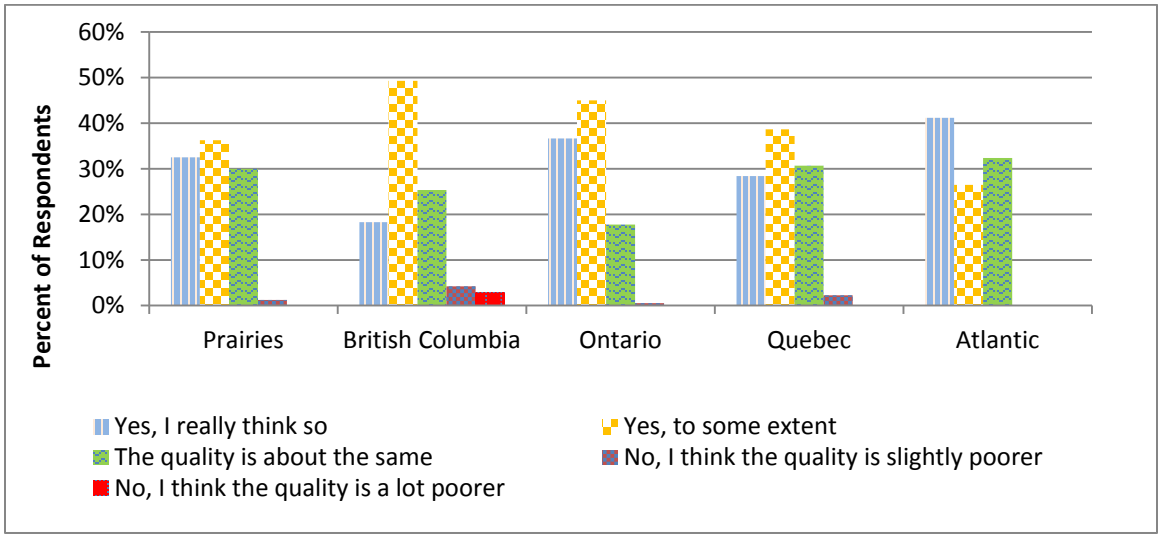

Figure 5.10: The 100% Canadian Milk Symbol as an Indication of Higher Quality by location- Ice cream Respondents

Source: Created by author using survey data. Number of respondents = 453.

5.1.4.3 Values and Attitudes towards Domestic Products

Respondents' attitudes toward domestic products were assessed based on their responses to several survey questions. One such question was: "***I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range***"[16]. Figure 5.11 shows the results from the milk respondents, from which it can be observed that approximately 34% of respondents "***strongly agree***" with the statement. An additional 38% ***"agree"*** that they would always purchase a domestic product over an imported product if the prices were within the same range. The results are similar for the respondents from the ice cream sample (Figure 5.13) and indicate that 38% ***"strongly agree"*** with the statement while an additional 35% ***"agree"*** while 18% indicated their indifference**.** The resulting total of 72% (38%+34%) and 73% (38%+35%) of respondents to the milk and ice cream surveys respectively responding positively is interesting given that domestically produced goods are not always indicative of higher standards. However, Phau and Prendergast (2011) posit that an observation of such values is an indication of patriotism given that domestic goods are generally preferred in countries where there is a strong sense of patriotism or national pride.

Figures 5.12 and 5.14 depict the results from the milk and ice cream survey samples respectively based on regional differences. Approximately 44% of respondents from both Ontario and Atlantic Canada indicated that they would always purchase a domestic product over an imported product if the prices were within the same range, indicating the highest percentage relative to other Canadian regions. From the perspective of ice cream respondents, respondents from the Prairies had the highest percentage indicating their preferences for domestic products, followed by Ontario (43% and 42% respectively). On the other hand, respondents from Quebec had the highest percentage of respondents (2%) who disagreed (respondents who disagreed plus strongly disagree) in both the milk and ice cream samples. British Columbia (BC) had the highest representation of respondents who were indifferent between domestic and imported products (25%) and the respondents who strongly disagreed that with the question (5%). With respect to the ice cream sample, Figure 5.14 indicates that the highest percentage of respondents who were

[16] Based on question 4 in the section " Patriotism/ Ethnocentrism"

indifferent reside in Atlantic Canada (29%), while again 2% of respondents from Quebec disagreed.

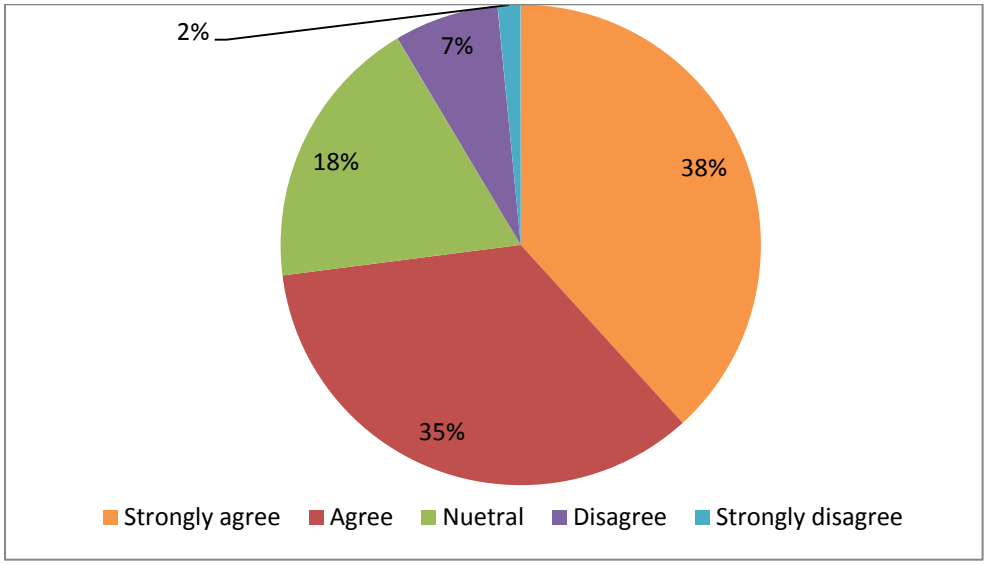

Figure 5.11: Attitudes toward Domestic Products - Milk Respondents
Source: Created by author using survey data. Number of respondents = 455.
Survey Question: "I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range"

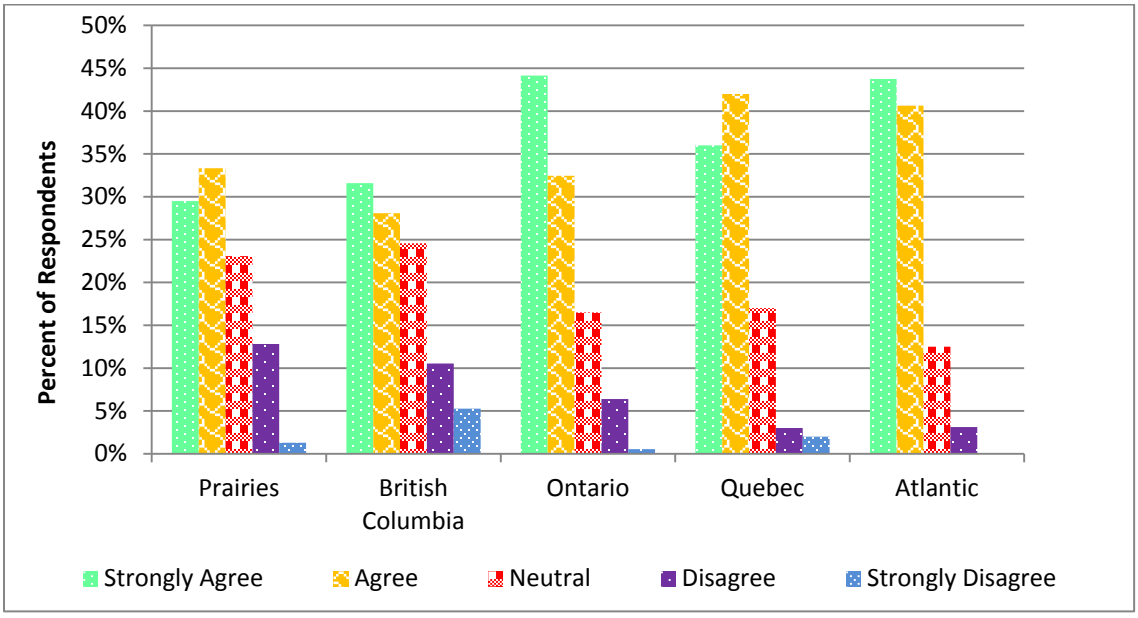

Figure 5.12: Attitudes toward Domestic Products by Location - Milk Respondents
Source: Created by author using survey data. Number of respondents = 455.
Survey Question: "I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range"

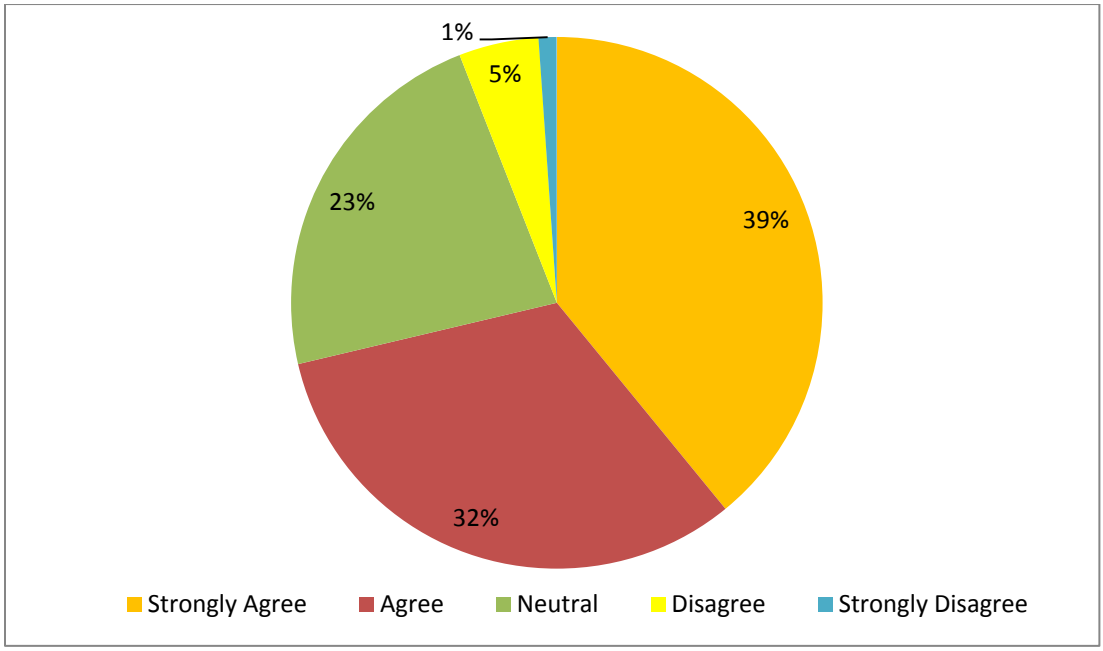

Figure 5.13: Attitudes toward Domestic Products - Ice Cream Respondents

Source: Created by author using survey data. Number of respondents = 453.

Survey Question: "I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range"

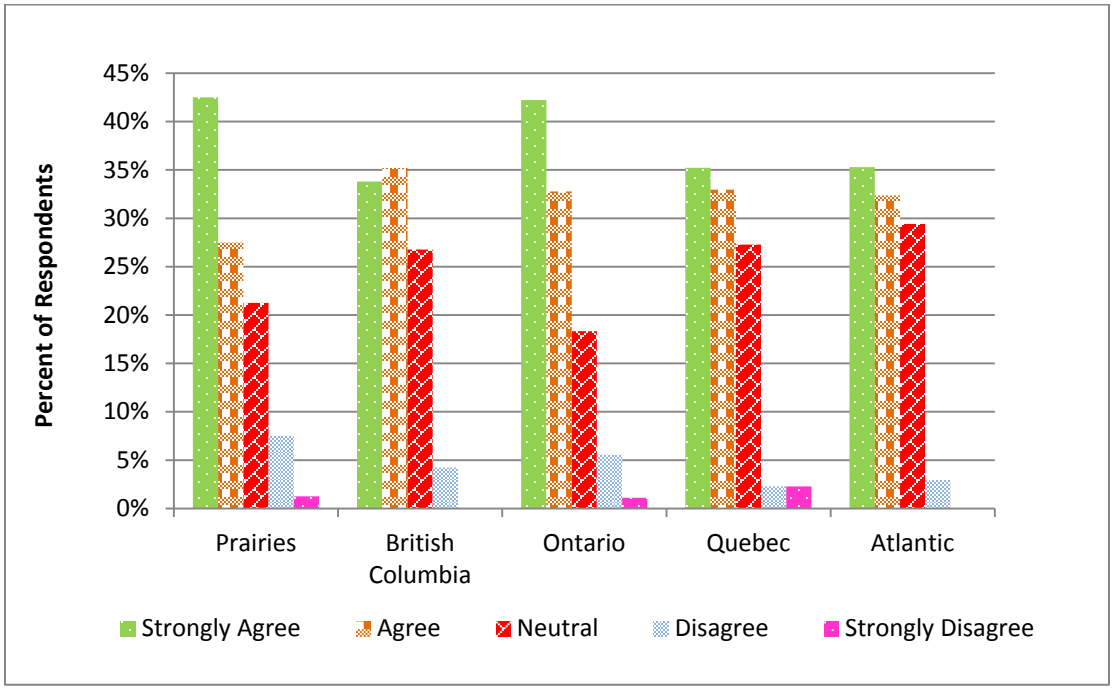

Figure 5.14: Attitudes toward Domestic Products - Ice Cream Respondents (by Location)

Source: Created by author using survey data. Number of respondents = 453.

Survey Question: "I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range"

5.1.4.4 Purchasing Habits & Preferences for Characteristics of Milk and Ice cream

Respondents' purchasing habits and preferences for different characteristics of milk and ice cream were also evaluated. Respondents' purchasing habits toward milk and ice cream were evaluated from survey questions that sought to assess respondents' frequency in purchasing different brands and types of milk and ice cream. Preferences toward different characteristics were evaluated by asking respondents to select from a list of factors[17] the most and least important when purchasing milk or ice cream.

Figure 5.15 shows that approximately 70% of respondents to the milk survey indicated that they had never purchased store brand milk. The result is also similar for milk with both a store brand label and the *100% Canadian milk* symbol, and milk labelled as organic with the *100% Canadian milk* symbol - approximately 68% and 78% respectively of the total number of respondents indicated that they have never purchased milk with these labels. These results are however surprising given high number of respondents that indicated their awareness of the *100% Canadian milk* brand. Also, 52% of the total number of respondents indicated that in a typical month they purchase milk with the *100% Canadian milk* symbol at least three times ((27% - 3 to 4 times and 25% over 4 times). National brand milk and national brand milk with the *100% Canadian milk* symbol also seem to be preferred among respondents in comparison to milk with other label/brand combinations as shown in Figure 5.15.

[17] Eight factors were listed: Price, fat content, brand, country of origin, appearance/packaging, nutritional content, taste, expiry date.

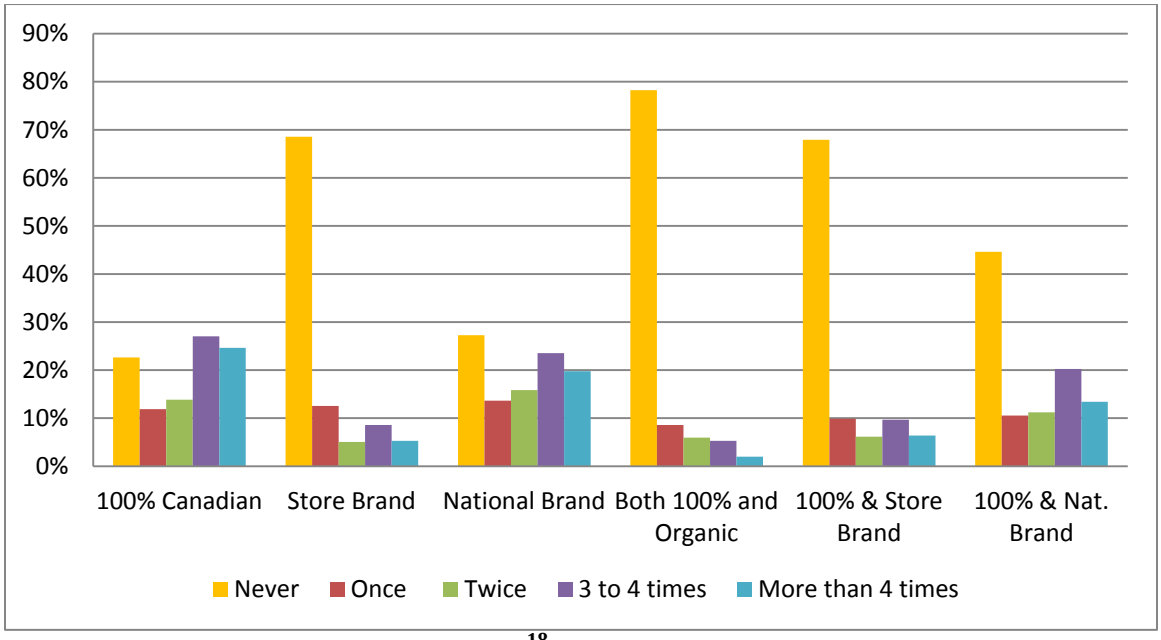

Figure 5.15: Purchasing Habits[18]- Milk Purchased by Label per Month

Source: Created by author using survey data. Number of respondents = 455.

The results obtained from the ice cream survey regarding purchasing habits are quite similar to those from the milk sample. Similar to the milk sample, respondents to the ice cream survey indicated that they do not frequently purchase ice cream sold under store brand labels, ice cream labelled *100% Canadian milk* and store brand, or ice cream labelled as *100% Canadian* milk and organic. This is concluded from the high percentage of respondents indicating that they had "never" purchased ice cream with these symbols or of these brands. Specifically, 46%, 59% and 80% (respectively) of the respondents to the ice cream survey indicated that they had never purchased store brand ice cream, store brand ice cream with the *100% Canadian milk* symbol and organic ice cream with the *100% Canadian milk* symbol in a typical three month period (see Figure 5.16).

It should however be noted that the organic milk market is relatively small in Canada and accounted for as little as less than 1% of total milk production in 2005/06 (Kendrick, 2009). Similarly, the market share for store brand milk represents a relatively small portion of the

[18] Based on question 2 in the section on "Awareness and Brand Preference"- *On a scale of 1 to 5, in a typical month how often do you purchase **MILK*** **with the following labels**

market, albeit significantly greater than the organic milk share. Store brand milk accounted for 5.6 percent of the total market share of milk in 2005/06 (Agriculture and Agri-Food Canada, 2009c).

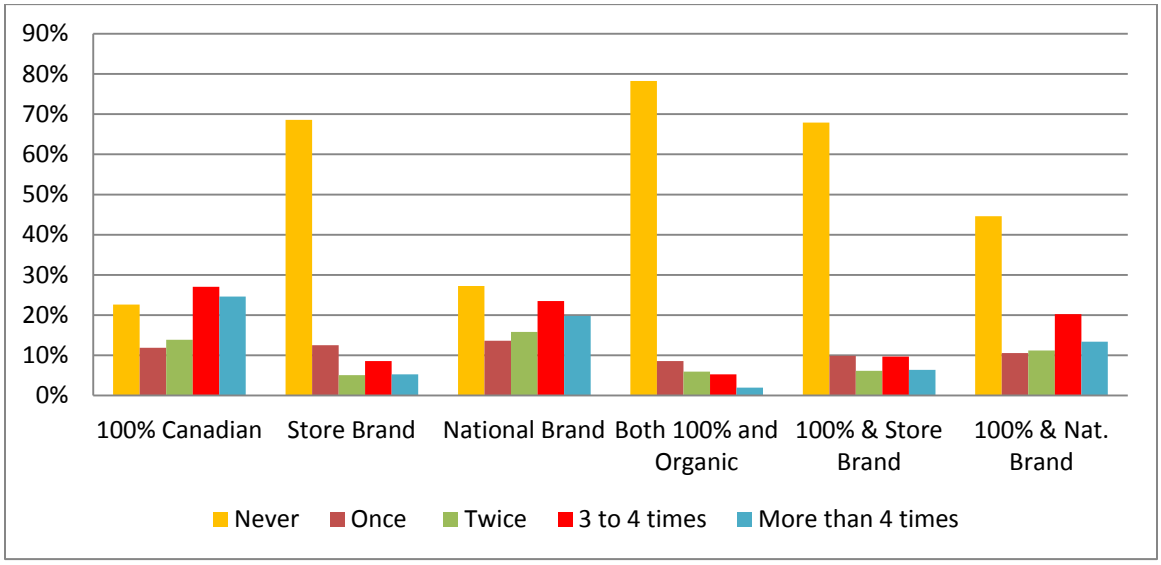

Figure 5.16: Purchasing Habits- Ice Cream Purchased by Label per Three Month Period
Source: Created by author using survey data. Number of respondents = 453.

5.1.4.5 Product Factors Most Important to Consumers of milk and Ice cream

An objective of this research is to ascertain the characteristics of milk and ice cream (and by extension other dairy products) which are most preferred or important to consumers. Consumers were therefore asked to select the factors viewed as most important to their purchase decision for milk and ice cream. Respondents were also asked to indicate the least important factors. The top three components that were deemed most important and least important from a list of eight attributes are presented in this section.

The top three characteristics that were deemed most important when purchasing milk accounted for 66% of responses as can be seen in Figure 5.17, these attributes are expiry date, price and taste. The representative percentage for each attribute was contrasted between respondents who consider these factors to be of least importance. Approximately 27% of the total number of respondents indicate that expiry date is an important attribute as opposed to 7% of respondents

who listed expiry date as one of the least important attributes when buying milk. Preference heterogeneity towards price was more evident, as while this attribute was ranked as one of the most important by 23% of respondents, 15% also ranked it as one of the least important attribute. Similarly, taste was ranked as one of the most important attributes by 17% of respondents, while 5% of respondents considered it to be one of the least important attributes.

Figure 5.17: Most Important Factors when Purchasing Milk
Source: Created by author using survey data[19]. Number of respondents = 455.

The top three most important characteristics when purchasing ice cream accounted for 79% of responses. As depicted in Figure 5.18, these attributes are taste, price and fat content with percentages of 43%, 28% and 8% respectively. Most respondents seem to agree that taste is an important factor, as only 6% indicated that it was one of the least important attribute considered when purchasing ice cream. On the other hand, 18% and 9% of the total number of respondents respectively ranked price and taste as being of least importance.

[19] Based on question 1(b) in the section "Consumers' Perceptions for attributes of Milk/ Ice-cream"-***From the factors above please specify the one that you would consider to be most important***" Respondents were shown this question after given eight attributes to consider when purchasing milk/ice cream-

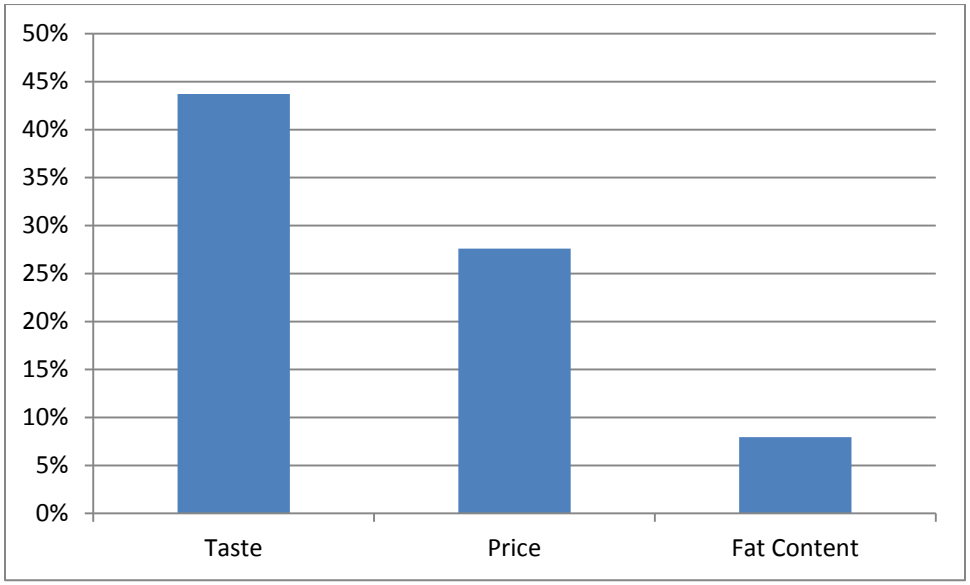

Figure 5.18: Most Important Factors when Purchasing Ice Cream
Source: Created by author using survey data. Number of respondents = 453.

5.1.4.6 Least Important Factors

The characteristics which respondents indicated to be of least importance when purchasing milk or ice cream were also taken into consideration. The top three least important characteristics accounted for 66% of consumer views towards least important attributes. When purchasing milk, consumers on average consider packaging, brand and price as the three least important characteristics (as reflected in Figure 5.19). It can be noted that 36%, 16% and 15% of respondents respectively also viewed these factors as least important when purchasing ice cream. When compared with the percentage of respondents who ranked these attributes as most important, it can be noted that virtually none of the respondents had identified packaging as an important attribute. This shows that preferences towards this attribute are rather homogenous in contrast to price.

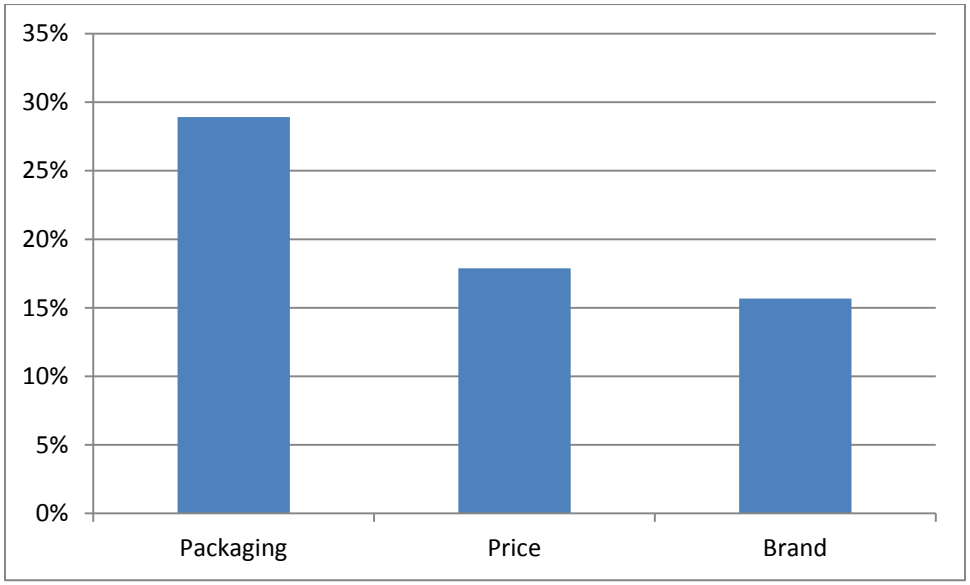

Figure 5.19: Least Important Factors when Purchasing Milk
Source: Created by author using survey data[20]. Number of respondents = 455.

The three characteristics (packaging, brand and price) considered to be least important to milk respondents were also considered to be least important to ice cream respondents although in a slightly different order (evident from Figure 5.20 below). These three attributes were considered to be of least importance to 62% of respondents.

Price was ranked as the second least important attribute accounting for 18% of respondents' views, however as evident above, a greater percentage (28%) of respondents considered it to be an important attribute. Similar to milk, virtually no-one considered packaging to be important when purchasing ice cream, while 16% of respondents considered brand to be least important as opposed to 6% who consider it to be of most importance

[20] Question 1(c) in the Survey section "Consumers' Perceptions for attributes of Milk/ Ice-cream"- ***"From the factors above please specify the one that you would consider to be least important***". Respondents were shown this question after given eight attributes to consider when purchasing milk/ice cream.

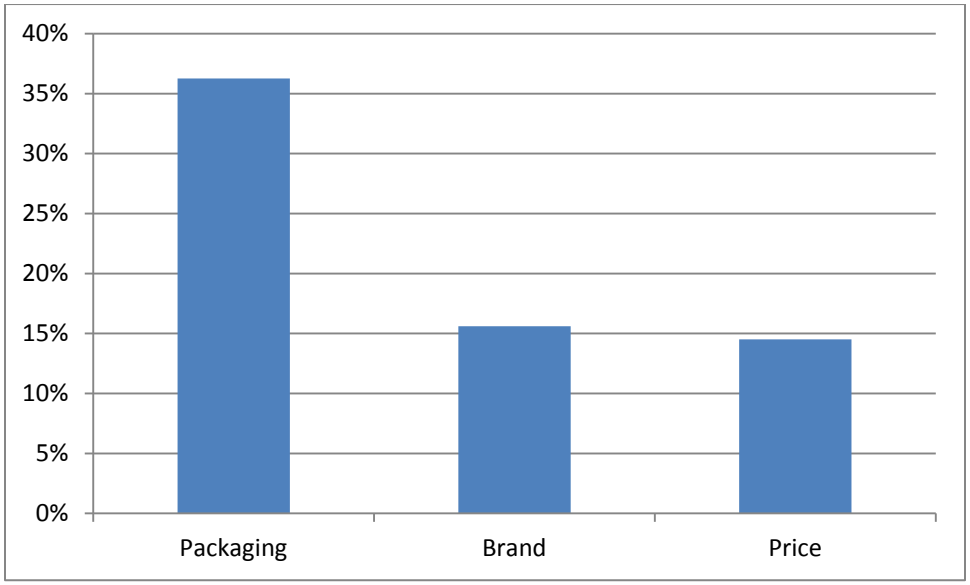

Figure 5.20: Least Important Factors when Purchasing Ice Cream

Source: Created by author using survey data. Number of respondents = 453.

5.1.5 Industry Knowledge

From the results observed above approximately 15% of the milk and ice cream respondents indicated that they usually purchase milk and ice cream at least once per month and in a three month period respectively. However, given that unlike ice cream, all milk sold in Canada is Canadian under the supply management system, it is pertinent to establish the role that industry knowledge played in influencing choices.

Rationally, it would be expected that if respondents were aware that all milk is 100% Canadian, then their willingness to pay for this attribute would not be affected by issues regarding safety and risk perceptions towards imported ingredients but would be more likely driven by other extrinsic factors. On the other hand, respondents to the ice cream survey would be expected to behave differently if they are more informed about the dairy sector, since ice cream can be made from imported modified milk ingredients. Therefore, as a means of evaluating how knowledge affects respondents' choices, respondents were given industry knowledge questions *after* completing the choice experiment section.

The industry knowledge questions asked in each survey were slightly different in order to capture knowledge specific to each product. The key industry knowledge question in the milk survey was a true or false question: "***With the exception of chocolate milk, all milk sold in Canada must be produced in Canada, so even if it does not display the 100% Canadian milk symbol, it is Canadian***"[21] respondents who answered this question incorrectly (by selecting false) were automatically given the follow-up question: ***"If the previous statement ("With the exception of chocolate milk, all milk sold in Canada must be produced in Canada, so even if it does not display the 100% Canadian milk symbol, it is Canadian") were true, would this affect any of your choices…..***"[22]. The result for these two questions can be seen in Figure 5.21 below. The results from the ice cream survey industry knowledge question: ***Ice cream can contain milk ingredients or modified milk ingredients imported from other countries such as the United States, Europe, Australia or New Zealand***[23] can be seen in Figure 5.22.

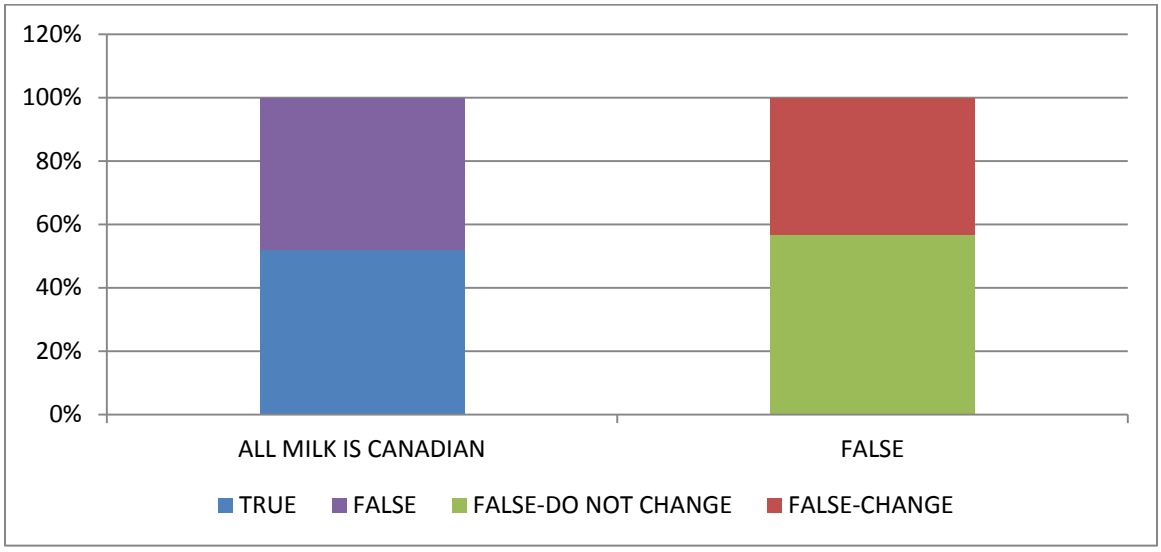

Figure 5.21: Industry Knowledge- Milk Respondents

Source: Created by author using survey data. Number of respondents = 455.
Combined responses based on the following two questions: "With the exception of chocolate milk, all milk sold in Canada must be produced in Canada, so even if it does not display the 100% Canadian milk symbol, it is Canadian" and "If the previous statement were true, would this affect any of your choices"

[21] Question 1 in the milk survey "Industry Knowledge" section
[22] Question 2 in the "Industry Knowledge" section
[23] Question 1 in the ice cream survey "Industry Knowledge" section

Figure 5.21 indicates that the milk survey respondents were not very knowledgeable of the Canadian dairy industry as almost 50% of respondents answered the industry knowledge question incorrectly. On the other hand, respondents to the ice cream survey appeared more knowledgeable as 71% answered the question correctly (see Figure 5.22).

The implication of the milk respondents being less knowledgeable about the dairy industry than the ice cream respondents is significant given that respondents' WTP for milk with the *100% Canadian milk* symbol may be positively influenced due to their lack of knowledge. In essence, respondents may be willing to pay more because they think they are receiving additional tangible benefits from buying milk with the symbol while in fact this may not be true as all milk is already 100% Canadian.

Of the number of respondents who provided an incorrect response to the industry knowledge question in the milk survey, 43% acknowledged that their choices in the discrete choice section would change if their answer to the knowledge question was incorrect (see Figure 5.21). The implication of this is that slightly under 25% of respondents to the milk survey might have responded differently had they known that milk is Canadian. The implication of the milk results is that respondents' WTP a premium for the *100% Canadian milk* symbol attribute is perhaps influenced by their lack of knowledge but clearly not entirely.

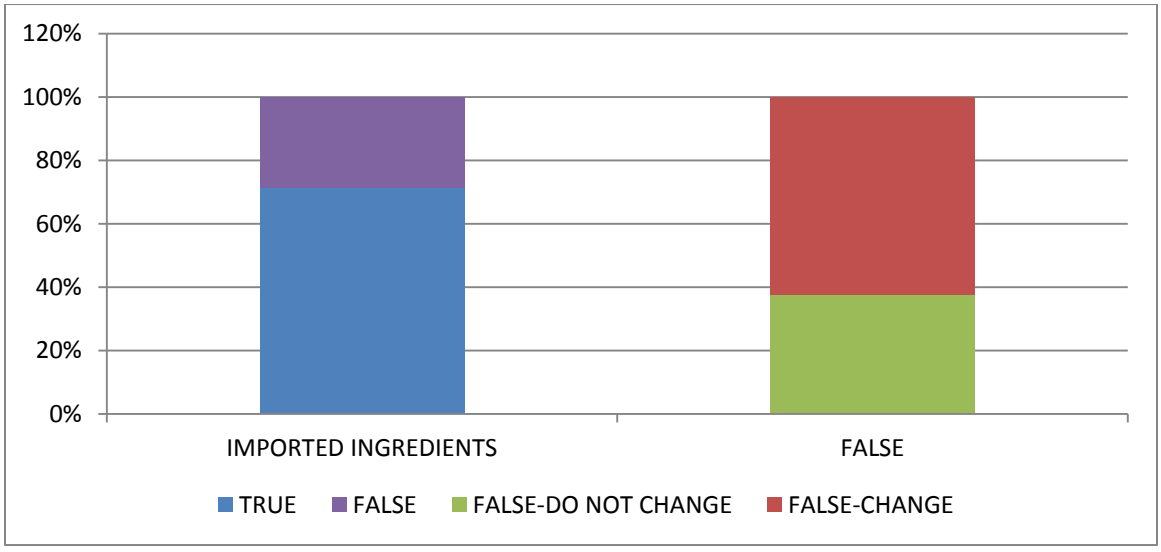

Figure 5.22: Industry Knowledge- Ice Cream Respondents

Source: Created by author using survey data. Number of respondents = 453.

Combined responses based on the following two questions: "With the exception for chocolate milk, all milk sold in Canada must be produced in Canada, so even if it does not display the 100% Canadian milk symbol, it is Canadian?*" and "If the previous statement were true, would this affect any of your choices"*

5.2 Factor Analysis: Incorporating the Extracted Factors

This section provides an overview of the method used to incorporate respondents' attitudinal characteristics in the analysis of preferences for milk and ice cream with the 100% Canadian milk symbol. Factor analysis enables a researcher to group similar questions with one underlying construct into one factor. The extracted factors, as well as measures of reliability, are discussed in this section.

The use of factor analysis as an analytical technique has existed since as early as 1904 (Anderson & Gerbing, 1982). Factor analysis is a data reduction method which is used to identify a small number of factors that explain most of the variance observed in a larger set of variables. The procedure entails extracting variables with high inter-correlations as a measure of one underlying factor. The use of factor analysis in this study provides a way of incorporating additional explanatory variables that capture dimensions of risk perceptions, values and general attitudes towards health that may influence consumers' choice of dairy products.

There are two types of factor analyses: confirmatory and exploratory factor analysis. Confirmatory Factor Analysis is employed in situations where the analyst already has some idea (based on past studies) of the theoretical construct of the variables (Anderson & Gerbing, 1982). Exploratory Factor Analysis is used when the latent factors affecting the variable in question are being tested from a set of possibly related variables. Exploratory factor analysis is a statistical technique widely used in the social sciences (Costello & Osborne, 2005). Exploratory factor analysis was the approach used to elicit the three initial factors (based on respondents' health profiles, risk perceptions and values).

Generally, prior to applying a factor analysis approach it is necessary to determine if the method is suitable. The viability of using factor analysis can be ascertained through the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy varies between 0 and 1, with values closer to 1 being better. This test measures the strength of the relationship between variables, with values closer to 1 indicating greater relationship strength. A value of 0.5 is the suggested minimum (Williams, Onsman, & Brown, 2010). In addition the Bartlett's test of sphericity can be used to test the null hypothesis that the correlation matrix is an identity matrix. If the null indicates that the correlation matrix is an identity matrix then this indicates that the variables in the correlation matrix are uncorrelated. If the null hypothesis is rejected and the Kaiser-Meyer-Olkin Measure of sampling adequacy is above .6 then factor analysis can be used. For this thesis the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .796 for the milk data and .807 for the ice cream sample. Also Bartlett's Test of Sphericity was rejected thereby confirming the appropriateness of factor analysis for the data.

Having verified that factor analysis is appropriate, there are different benchmarks that can be used to determine the number of factors to extract. The Kaiser Criterion is one such benchmark. It stipulates that the "optimal" number of factors with eigenvalues greater than one can be included as a factor. The Kaiser criterion can however cause more factors than necessary to be retained, in addition, it has been suggested that this is the least accurate method to use (Costello & Osborne, 2005). Another method that can be used to determine the "optimal" number of factors to retain is the scree plot, which graphically depicts the magnitude of each extracted

factor in descending order and therefore indicates the relative importance of each extracted factor. As a rule of thumb, the number of factors should be equal to the number of factors that occur prior to the last major drop in magnitude evident from the scree plot. In this particular case, the scree plot and prior expectations were used to decide on the number of factors to retain. However because of prior expectations based on survey question design and research hypotheses, factor extraction was restricted to three factors[24]. Factor loadings that are above 0.5 are displayed as those below were suppressed in the output leading to cleaner or less ambiguous factors being obtained.

The three factor components that were extracted from both the milk and ice cream data and can be labelled as: 1) Health consciousness, 2) Domestic values, 3) Risk Preference or Risk perception respectively. The questions defining each factor were all 5 point likert scale questions.

Tables 5.3 and 5.4 indicate the factors that were extracted from the milk and ice cream survey data respectively and represent actual survey questions. Values that are closest to 1 are preferred as it indicates the strength of correlation between all variables defining the factor. As it relates to the health factor (factor 1), the questions comprising this factor have a likert scale of 1 to 5, where 1 indicates that respondents strongly agree with the question and 5 indicates strong disagreement. Six questions define the health consciousness factor for the milk sample, while seven questions define the same factor for the ice cream survey sample (See Tables 5.3 and 5.4). Therefore, a respondent who selected one on the five point likert scale for the questions defining the health factor in the milk sample indicates that they purchase fast-food quite frequently and would therefore be considered less health conscious than individuals who selected 5 for these questions.

Similarly, the questions defining factor 2 measure the construct of individuals' domestic values relating to patriotism. This factor is defined by five questions for the milk respondents and six questions for the ice cream respondents. Selecting 1 on the scale of 1 to 5 for any of these

[24] The results generated for both the milk and ice cream sample for the three factors can be seen in Appendices D and E respectively.

questions is an indication of relatively strong values as opposed to selecting 4 or 5. It is hypothesized that individuals with strong values (lower likert scale numbers) will have a greater willingness to pay for products with the *100% Canadian milk* attribute.

The third factor measures the underlying construct of respondents' risk preferences. As can be observed in Tables 5.3 and 5.4 this factor is relatively weak given that it is defined by three variables (Table 5.3) and the strength of correlation between the variables is relatively low (Table 5.4). Nonetheless, respondents selecting low values as opposed to high values have a higher risk preference, as selecting 1 for any of these questions shows that respondents have high levels of risk preference as opposed to 5 which indicates a low level of risk preference. It is expected that respondents with relatively low levels of risk preference will have a greater willingness to pay for products with the 100% Canadian milk symbol based on the premise that these individuals may want the reassurance that they are buying domestic products as opposed to imports.

Table 5.3: Extracted Factor Components: Milk Sample

	Component		
	Health	Values	Risk
How often do you eat **Burgers** from a fast food restaurant	0.807		
How often do you eat **Pizzas** from a fast food restaurant	0.755		
How often do you eat **Fries** from a fast food restaurant	0.791		
How often do you eat **Hot dogs** from a fast food restaurant	0.767		
How often do you eat **Pastry** from a fast food restaurant	0.685		
How often do you eat **Fried Chicken** from a fast food restaurant	0.735		
I think that buying a local product instead of a foreign product helps to support the local economy.		0.747	
I consider myself to be patriotic		0.762	
I feel a sense of joy and pride whenever I see the maple leaf symbol known to be associated with Canada		0.779	
I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range		0.774	
It is not right to purchase foreign products, because it puts Canadians out of jobs		0.553	
I am usually interested in trying out foreign products			0.672
I would consider myself to be more risky than the average person			0.654
A little risk is good			0.669

Table 5.4: Extracted Factor Components: Ice Cream Sample

	Component		
	Health	Values	Risk
How often do you eat **Fries** *from a fast food restaurant?*	0.809		
How often do you eat ***Burgers*** *from a fast food restaurant?*	0.791		
How often do you eat ***Pizzas*** *from a fast food restaurant?*	0.775		
How often do you eat **Fried Chicken** *from a fast food restaurant?*	0.762		
How often do you eat **Hot dogs** *from a fast food restaurant?*	0.748		
How often do you eat **Pastry** *from a fast food restaurant?*	0.671		
Doctors are in charge of my health therefore, I am not concerned about it	0.517		
I consider myself to be patriotic		0.785	
I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range		0.710	
I think that buying a local product instead of a foreign product helps to support the local economy.		0.761	
I feel a sense of joy and pride whenever I see the maple leaf symbol known to be associated with Canada		0.753	
***I am usually not concerned about the origin of food		0.534	
It is not right to purchase foreign products, because it puts Canadians out of jobs		0.508	
A little risk is good			0.658
I am usually interested in trying out foreign products			0.542
***I only purchase brands tried and proven			0.593
I would consider myself to be more of a risk taker than the average person			0.528
***I don't believe in making risky investments			0.591

***The scales on these factors were reversed.

5.2.1 Factor Reliability Assessment & Factor Score Calculation

Having extracted the factors of interest, the reliability of the extracted factors should be evaluated prior to incorporating these factors into the analysis. Therefore, the Cronbach's alpha reliability test was conducted. Cronbach's alpha is used to ascertain the internal consistency of a set of items (questions) in representing a factor and hence factor reliability (Cronbach, 1951). The reliability scores for factors 1, 2 and 3 (Health, Values and Risk) were .859, .784, and .531 respectively for the milk sample and .852, .784, and .583 for the ice cream sample[25].

[25] See Appendices D and E for more details from the milk and ice cream sample respectively

The reliability scores for the risk preference factor from both the milk and ice cream samples have low levels of internal consistency (below .6) among the variables included, but an acceptable measure of internal consistency nonetheless. Darren and Mallery (2003) suggests that an alpha below 0.5 is unacceptable, however, the alpha for the risk preference factor, although low is greater than 0.5. In addition, the level of unidimensionality for both risk preference factors can be evaluated to confirm that the factor is measuring one underlying construct. Lack of unidimensionality is an indication of measurement misspecification (Anderson & Gerbing, 1982). Unidimensionality can be evaluated by conducting a confirmatory factor analysis[26] using only the variables included in defining the risk preference factor in both samples. Unidimensionality was evident from confirmatory factor analyses which indicated that the risk preference factor in both samples measure one latent construct, as the eigen values for the first variable were approximately 52% in the milk sample and 38% in the ice cream sample. This therefore justifies the inclusion of factor three (risk preference) in the analysis although the alpha has borderline acceptability. However caution should be applied when making extrapolations based on this factor given the relatively low reliability.

From the factor components extracted, factor scores were computed for each of the three factors to facilitate the incorporation of each variable in the analysis. The factor scores are computed by the multiplication of each factor loading (factor loadings are depicted in Tables 5.3 and 5.4) relevant to a specific factor component by the respondent's score (response on the likert scale) and then summing over all variables to get a factor score for each individual respondent. Therefore, each individual is assigned their own factor score for each of the extracted factors. If a respondent has a relatively high factor score for the health factor, for example, then this indicates that this individual is relatively health conscious based on the premise that health conscious individuals consume less fast-food (recall that high likert scale values represent relatively low frequency of consumption for fast food products). Also a high score for domestic values indicates that these respondents have relatively low domestic values, and a high score for risk preference can be used as an indication that these respondents are more risk averse.

[26] Confirmatory analyses were conducted for all the factors for both the milk and ice cream samples. The relevant tables can be found in Appendices D and E in the tables depicting the Total variance explained.

The derived factor scores will facilitate the testing of the hypotheses outlined in Chapter 3, namely that: health conscious respondents may express significantly different WTP than respondents who are less health conscious. This hypothesis is based on the premise that health conscious consumers (high factor scores in this study) may search more for quality cues when shopping. These individuals may also be more conscious of labelling and more concerned about the origin of ingredients in their food products. According to Agriculture and Agri-Food Canada, consumers mainly view freshness, nutrition and food safety as quality cues (Agriculture and Agri-Food Canada, 2009a). Therefore, these individuals may more readily pay for food that they perceive as being more nutritious or healthier such as ice cream made from *100% Canadian milk* as opposed to modified milk ingredients. In addition, it is expected that respondents with relatively high domestic values (low factor scores) will also be willing to pay a premium for ice cream and milk with the *100% Canadian milk* symbol as opposed to respondents with lower domestic values (based on their factor scores). It was also hypothesized that consumers who are risk averse (high factor scores) will have a greater WTP for products with the *100% Canadian milk symbol*. The factor scores are used to test these hypotheses through the incorporation in the discrete choice model estimations of interactions between the factor scores and the *100% Canadian milk* attribute. The interaction between these factors and the *100% Canadian milk* attribute were incorporated as *chealth*, *cpatriot*, and *crisk*, respectively.

5.3 Chapter Summary

The descriptive results from both the milk and ice cream samples were presented in this chapter. The information offered insights into respondents' perceptions, purchasing habits and attitudes toward different characteristics of milk and ice cream and how these factors differed according to respondents' location. In addition, the factor analysis approach employed in this study was also discussed. Three factors relevant to assessing respondents' choices were extracted: health consciousness, domestic values and risk preferences. The following chapter will show how these factors influence preferences and respondents' willingness to pay for milk and ice cream with the *100% Canadian milk* attribute.

Chapter 6: Results: Product Attributes and Individual Factors Affecting WTP for the 100% Canadian Milk Symbol

This chapter builds on the preceding chapter by introducing the variables used in estimating the Multinomial logit (MNL) and the Random Parameter Logit (RPL) models. The coding of the survey data is also discussed. More importantly, results from the estimations are analyzed and discussed. The results presented are those from the MNL main effects model and various modifications of the RPL model. Both main effects variables and interaction terms are estimated using the milk and ice cream survey data. From the models different willingness to pay estimates are calculated and compared. The hypotheses posited in Chapter 3 are tested and implications are drawn.

6.1 Coding the Variables

Dummy coding and effects coding were used in coding the variables in the choice experiment. The attributes in the choice section of the survey (type: organic or conventional, brand: store or national and 100% Canadian: present or absent) were effects coded, price however remained continuous. Effects coding was used in contrast to dummy coding because as authors such as Hensher et al. (2005) and Bech and Gyrd-Hansen (2005) posit, there is an inherent problem with dummy coding attribute levels. Given that the effect of the base level cannot be separated from that of the regression constant, such coding potentially results in perfect confoundment with the grand mean of the regression. Covariates such as gender, income, education and language, however, were dummy coded. As shown below, Table 6.1a and Table 6.1b provide descriptions of the variables used in the estimation process and explain how each variable was coded for use in the estimations.

Table 6.1a: Coded Variables

Attribute	Code Name	Description
100% Canadian	Cand	1 if product is labelled 100% Canadian milk, -1 otherwise
Org	Org	1 if product is organic , -1 otherwise
National brand	Nat	1 if product is a national brand, -1 otherwise
Price	Price	Continuous
Gender	Gen	1 if respondent is female 0 otherwise
Alternative Specific Constant	ASC1	1 if alternative 4 (no choice alternative) is chosen, 0 otherwise
Education	Edu	*Linear Coding* 0 some high school and High School 1 Some technical, Business College, and Completed Tech. / business College 2 Some University and Bachelor's Degree 3 Graduate degree
Income	Income	*The midpoint is used to code the different categories into a linear variable* 12,500 - Less than $25,000 35,000 - $25, 000 to $44,999 55,000 - $45,000 to $64,999 75,000 - $65,000 to $84,999 95,000 - $85,000 to $104,999 , 127,500 - $105,000 to $150,000 187,500 - More than $150,000
Prairies	Prai	1 if respondents reside in either Saskatchewan, Alberta or Manitoba, 0 otherwise
Atlantic	Alt	1 if respondents reside in Newfoundland, Prince Edward Island, Nova Scotia, or New Brunswick, 0 otherwise
British Columbia	BC	1 if respondents reside in British Columbia 0 otherwise
Quebec	Que	1 if respondents reside in Quebec, otherwise

Table 6.1b: Interaction Terms

Code	Description
CanOrg	Interaction between 100% Canadian milk and organic
CanNat	Interaction between 100% Canadian and national brand
CanAge	Interaction between 100% Canadian and respondents' age
CanGen	Interaction between 100% Canadian and female
CanInc	Interaction between 100% Canadian and household income
CanEdu	Interaction between 100% Canadian and respondents level of education
CandKnw	Interaction between the 100% Canadian attribute and respondents who answered the milk/ice cream industry knowledge question correctly
CHealth	Interaction between the 100% Canadian attribute and health conscious respondents
CPatriot	Interaction between the 100% Canadian attribute and domestic values
CRisk	Interaction between the 100% Canadian attribute and respondents' risk preference
CanPrai	Interaction between respondents residing in the Prairies and the *100% Canadian milk* attribute
CanAlt	Interaction between respondents living in the Atlantic region and the *100% Canadian milk* attribute
CanBC	Interaction between respondents residing in British Columbia and the *100% Canadian milk* attribute
CanQue	Interaction between respondents residing in Quebec and the *100% Canadian milk* attribute

6.2 MNL Results: Milk Sample

Recall that each choice set consists of four alternatives generically labelled A, B, C and D comprised of four attributes with different levels (2, 2, 2, and 4). The estimated coefficients can be interpreted as the effect the attribute level has on a respondent's utility level. Therefore, a positive coefficient indicates that the respondent's utility increases when that attribute (level) is present, while a negative coefficient indicates decreased utility from selecting a choice with that attribute level. The impact an attribute has on utility influences the probability that milk or ice cream with the attribute of interest will be selected.

The basic MNL model was first estimated with main effects only (a model focusing on the isolated effect of an attribute on utility and ignoring interactions between attributes). The results can be seen in Table 6.2 which indicate that the coefficient for the *100% Canadian milk* attribute (Cand) is positive and significant. The positive coefficient is an indication that, in general, respondents derive positive utility from choosing milk alternatives with the *100% Canadian milk*

attribute. The willingness-to-pay column (labelled WTP) represents the premium that consumers are willing to pay for having an attribute present. It can be noted that respondents are willing to pay an additional $2.09 for a 2-litre carton of milk with the *100% Canadian milk* symbol.

From Table 6.2 it can also be observed that the coefficient of the second attribute representing organic milk (Org) is negative and significant, indicating that respondents on average derive negative utility from choosing an organic milk alternative. In addition, it can also be observed that respondents discount milk labelled as organic by 64 cents as opposed to conventional milk. This finding is surprising since in reality a market does exist for organic milk, albeit fairly small. However, it should be noted that the MNL takes into consideration preferences on average and does not account for heterogeneity in preferences. Therefore the estimated willingness to pay can be more precisely interpreted as WTP on average which does not mean this attribute is not valued by some respondents. Another possible explanation for the negative coefficient is hypothetical bias. Hensher (2010) posits that hypothetical bias is usually a concern in stated preference studies. He further noted that this occurrence can result in deviations in estimation results from real market evidence.

The next coefficient presented in Table 6.2 represents national brand milk, which is positive and significant. The sign of the coefficient indicates that respondents receive higher utility from choosing milk with the national brand attribute relative to the store brand attribute.

Table 6.2 also shows that the estimated regression produces a negative price coefficient, which indicates lower utility from higher milk prices. The sign of the coefficient is consistent with *a priori* expectations as we generally expect consumers to prefer lower prices. In addition, the negative sign of the alternative specific constant (ASC1) shows that respondents on average prefer one of the three milk alternatives (A, B, or C rather than the no purchase option, alternative D).

Table 6.2: Milk- MNL Main Effects

Variable	Coefficient	T-ratio	WTP	T-ratio
Cand	.643***	28.612	2.093***	21.643
Org	-.197***	-9.746	-.64***	-9.069
Nat	.09***	3.571	.292***	3.596
Price	-.615***	-24.926	-	-
ASC1	-4.1***	-33.898	-	-
Pseudo R^2		0.185		
Log likelihood Function		-3711.74		
***,** and * represent significance at the 1%, 5% and 10%				

Although most of the coefficient signs presented in Table 6.2 are consistent with *a priori* expectations, the basic MNL model displays a relatively poor fit for the data. This is evident from a low McFadden pseudo R^2 value of .19. According to Hensher et al. (2005) a pseudo R^2 value ranging between .20 and .40 reflects a relatively good fit. As highlighted in Chapter 4, several adjustments can be made in an attempt to improve the model fit. These modifications include the use of interaction terms, and the estimation of a more advanced model to account for heterogeneity. Both of these methods are explored as the RPL model is estimated with both main and interaction effects. The RPL model is able to accommodate preference heterogeneity among respondents[27].

6.3 Random Parameter Logit Results: Milk Sample

The RPL approach to estimating consumers' choices provide an opportunity to account for heterogeneity in consumers' preferences. Specifically, differences in individuals' preferences for various attributes can be taken into consideration. Estimating RPL models is expected to provide better model fits and higher pseudo R^2 values. A RPL was first estimated with main effects only. In this model price and the alternative specific constant were estimated as fixed parameters while the other main effects attributes (*100% Canadian milk,* organic, national brand) were estimated as random parameters.

[27] It is the norm to test for IIA before moving on to a more advanced model such as the RPL. The Hausman test requires the estimation of an unrestricted model – that is a model inclusive of all alternatives, and a restricted model – a model that is estimated with the exclusion of at least one alternative. The Hausman test was conducted and it was confirmed that a model less restrictive than the MNL would be more appropriate for the data. Results for the Hausman test for the milk and ice cream data are located in Appendix K

6.3.1 Random Parameter Logit Main Effects

In comparison to the results from the MNL model in Table 6.2, the RPL logit presented in Table 6.3 below provides an improvement in the goodness of fit evident from an improvement in the pseudo R^2 to 0.27 as opposed to .19 in the previous MNL main effects logit model. A pseudo R^2 of 0.27 is an acceptable fit according to the benchmark provided by Hensher et al. (2005).

As previously noted, the parameters of the MNL model were estimated as fixed and as such do not account for heterogeneity in preferences across respondents. In contrast, the parameters in the RPL model can be specified to follow various distribution patterns such as normal, triangular, lognormal or any other specified distribution. In estimating the RPL model, the random parameters were specified to follow a normal distribution as both negative and positive preferences and perceptions can easily be accounted for when this distribution is employed.

From observing Table 6.3, it can be noted that the results from the RPL model are consistent with those from the MNL model - the signs of the parameters remain the same and are also highly significant. However, the WTP estimate for the *100% Canadian milk* attribute was marginally greater at $2.20 in comparison to the main effects MNL estimate at $2.09, while the WTP values for organic labelled and national brand milk were also approximately the same at -68 cents and 21 cents respectively.

The fixed coefficients in the model, namely price and the no-purchase option, represent non-random or average utility values which suggest that respondents' preferences for these attributes are homogeneous and can be ascertained from the mean preferences for these attributes. This conclusion was drawn from observing that allowing these variables to be random resulted in insignificant standard deviations. An insignificant standard deviation suggests that there is no significant dispersion around the mean as it relates to preferences. The significance of the standard deviation of the random parameters indicate sources of heterogeneity in respondent's choices of milk with the *100% Canadian milk* symbol, milk labelled as organic or national brand.

Table 6.3: Milk- RPL Main Effects

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Cand	.882***	16.051	2.196***	21.266
Org	-.273***	-8.751	-.68***	-9.107
Nat	.084***	2.35	.208***	2.323
Non-random Parameters in Utility Function				
Price	-.803***	-16.724	-	-
ASC1	-4.756***	-24.262	-	-
Derived Standard Deviations of Parameter Distributions				
NsCand	.597***	4.411	-	-
NsOrg	.604***	5.078	-	-
NsNat	.832***	8.079	-	-
Pseudo R^2		0.270		
Log likelihood Function		-3683.9		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

In addition to exhibiting an improved model fit, the results from the RPL model in Table 6.3 have an additional benefit in that, by estimating random variables following a normal distribution, deeper analysis and more meaningful inferences can be drawn from the results. Specifically, the number of respondents with either a preference or dislike for the attributes estimated as random parameters can be evaluated from the distribution. Because the normal distribution captures a positive and a negative dispersion around the mean, both positive and negative attribute preferences can be captured. In line with Hu, Veeman, & Adamowicz (2005) and Train (2009) - for a random parameter that is normally distributed, the probability of $\beta < 0$ can be represented as Φ {(0-b)/σ} and the probability of $\beta > 0$ can be estimated as 1- Φ {(0-b)/σ}, the density function of the normal distribution can be represented as $\Phi(\beta|b, \sigma^2)$.

In evaluating respondents' preferences for the randomly estimated attributes it can be noted that the *100% Canadian milk* attribute is strongly preferred among respondents as 93% of respondents have a positive perception of this attribute. Table 6.4 reveals that the *organic* and *national brand* attributes elicit weaker preferences, as only about one-third of respondents indicated a preference for organic milk and 54% indicated a preference for national brand milk. The results of these preferences are indicative of consumers' WTP for these attributes as respondents on average discounted organic milk relative to conventional milk. On the other

hand, based on the models estimated thus far, respondents have indicated that they are willing to pay a premium for the *100% Canadian milk* attribute.

Table 6.4: Milk- Preference Distribution

Variable	Positive Perception	Negative Perception
Cand	93.0%	7.0%
Org	32.5%	67.5%
Nat	54.0%	46.0%

6.3.2 Random Parameter Logit with Selected Interactions

Adding two-way interactions between attributes captures how both attributes jointly impact preferences and if they are considered complements or substitutes. This model estimates main effects and two two-way interaction terms: 1) the interaction between *100% Canadian milk* and organic (CanOrg), and 2) the interaction between *100% Canadian milk* and the national brand attribute (CanNat). The first interaction term represented by CanOrg captures how milk labelled organic with the *100% Canadian milk* symbol influences consumers' preferences. Similarly, the second interaction term CanNat captures the effect of displaying the symbol on national. This RPL model allows all main effects to be random following a normal distribution while the interactions between *100% Canadian milk* symbol and organic, and the *milk symbol* and national brand are non-random parameters (including these parameters as random revealed that there was no dispersion around the mean), price and ASC1 also remain fixed. The results from this model are presented in Table 6.5.

The estimated model results in a marginal improvement in the pseudo R^2 value in comparison to estimating only main effects (as seen in Table 6.3). From Table 6.5, it can be observed that the results from the RPL model with selected interactions are similar to the results generated both from the MNL and RPL models for the main effects variables, given that the coefficients, signs and magnitudes are similar. However, of particular interest in this model are the estimated interaction terms. Louviere et al. (2000) suggest that the sign of an interaction effect can be used to show whether the relationship between the variables is that of a complement or substitute. The interaction between the *100% Canadian milk* attribute and the organic attribute, and the interaction between the *100% Canadian milk* attribute and the national brand attribute result in

positive and negative coefficients respectively. These results therefore indicate that the organic attribute and the symbol are complements but the national brand attribute and the symbol are substitutes. Recall that estimation of the main effect for the organic attribute resulted in a negative coefficient and national brand attribute resulted in positive coefficient (as seen in Table 6.2 and Table 6.3 above), which means that respondents discounted organic milk relative to conventional milk but received higher utility from choosing national brand milk relative to store brand milk. However, the results presented in Table 6.5 indicate that when milk with the national brand attribute also displayed the *100% Canadian milk* symbol, utility was negatively affected. However, respondents derived positive utility when milk with the organic attribute also displayed the *100% Canadian milk* symbol. The implication is that the combination of attributes can have varying impact on consumers' utility. The results from this model can be used as an indication that co-branding combining an organic label with the *100% Canadian milk* symbol also adds value to milk.

When interaction terms are estimated in a model the WTP calculation differs from a model with interactions. Recall from equation 19 in Chapter 4 that in estimating the WTP for an attribute all interaction effects must be captured. Therefore in estimating the WTP for the national brand attribute both the main effect and interaction effects with the national attribute are taken into consideration. The estimate shows that WTP for the national brand attribute is insignificant. WTP for the symbol remained positive and significant while WTP for the organic attribute remained negative and significant.

Table 6.5: Milk- RPL with Selected Interactions

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Cand	.934***	16.40	2.294***	13.811
Org	-.317***	-8.98	-.371***	-4.021
Nat	.117***	3.23	-.120	-1.040
Non-random Parameters in Utility Function				
CanOrg	.166***	4.788	.406***	4.795
CanNat	-.166***	-4.906	-.404***	-5.082
Price	-.814***	-16.783	-	-
ASC1	-4.771***	-24.174	-	-
Derived Standard Deviations of Parameter Distributions				
NsCand	.538**	3.752		
NsOrg	.712***	5.945		
NsNat	.807***	7.591		
Pseudo R^2		0.276		
Log likelihood	Function	-3653.491		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

6.3.3 Random Parameter Logit with Interactions, Covariates and Factors

Socio-economic variables such as respondents' age, education level, gender, and income are expected to allow further exploration of heterogeneity in preferences. The inclusion of socio-economic information can improve the model's explanatory power as such variables can assist in explaining the general likes and dislikes of respondents based on the highlighted characteristics. With this in mind, the next model accounts for several factors that could assist in explaining differences in preferences towards the *100% Canadian milk* attribute.

The next model accounts for differences in respondents' gender, age, education and income. This model also accounts for differences in location by explicitly evaluating preferences according to where respondents reside. Regional differences in preferences have shown to be a significant factor in differences in WTP estimations as highlighted in the literature review chapter. Respondents are therefore segmented into one of five regions: 1) Prairies (respondents from Saskatchewan, Alberta and Manitoba), 2) Quebec, 3) Ontario, 4) British Columbia, and 5) Atlantic (respondents from Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick). The location variables (expressed as Prai, Que, Ont, BC, Atl) were interacted with

the *100% Canadian milk* attribute to ascertain preferences for milk displaying the 100% Canadian milk symbol according to locations.

Table 6.6 indicates that the coefficients previously estimated remain the same with respect to signs, magnitudes and levels of significance. As it pertains to the newly added variables (socio-economic variables and region), it can be observed that there is no significant difference in preferences for a 2-litre carton of milk with the *100% Canadian milk* symbol between respondents from different age groups (CanAge) or income (CanInc) categories. The interaction between the *100% Canadian milk* attribute and respondents' education level (CanEdu) indicates that more educated respondents discount the *100% Canadian milk* symbol by 16 cents. This could perhaps be because they are more knowledgeable[28] and know that there is no real difference in milk, whether or not it displays the 100% Canadian milk symbol.

As it relates to regional differences across Canada, respondents from Quebec and the Prairies discount milk with the *100% Canadian milk* symbol by 76 cents and 52 cents respectively in comparison to respondents from Ontario. The coefficients for respondents from British Columbia and Atlantic Canada were statistically insignificant. These coefficients indicate that they were no statistical differences in willingness to pay with respect to Ontario respondents.

Overall, the model reflects a marginally better fit, as the pseudo R^2 improved to .28 as opposed to the previous models with fits of .27 and .276. The sign of the price coefficient was also intuitively consistent as it indicates that consumers derive disutility from paying higher prices. The negative sign of the ASC1 coefficient also indicates that respondents derived disutility from not purchasing milk as opposed to purchasing milk.

[28] As an exploratory analysis a MNL model was estimated with an interaction term between education and industry knowledge. The results indicate that respondents who had a higher level of education were also more knowledgeable. The results can be seen in Appendix J

Table 6.6: Milk- RPL Accounting for Socio-Economic and Regional Differences

Variable	Coefficient	T-Ratio	WTP[29]	T-Ratio
Random Parameters in Utility Function				
Cand	1.184***	9.24	1.427***	3.481
Org	-.319***	-8.92	-.370**	-3.993
Nat	.118**	3.22	-.120	-1.068
Non-random Parameters in Utility Function				
CanOrg	.167***	4.813	.407***	4.838
CanNat	-.167***	-4.958	-.407***	-5.136
CanAge	-.001	-0.763	-0.004	-0.763
CanInc	0.000	0.241	0.000	0.241
CanGen	-0.011	-0.184	-0.056	-0.184
CanEdu	-.068**	-1.878	-.164**	-1.887
CanQue	-.315***	-3.793	-.768***	-3.862
CanPra	-.216**	-2.429	-.528**	-2.442
CanBC	-.033	-0.336	-.082	-0.336
CanAtl	.014	0.11	.316	0.913
Price	-.82***	-16.720	-	-
ASC1	-4.791***	-24.025	-	-
Derived Standard Deviations of Parameter Distributions				
NsCand	.528***	3.645	-	-
NsOrg	.724***	5.968	-	-
NsNat	.822***	7.638	-	-
Pseudo R^2		0.278		
Log likelihood Function		-3641.1		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

In order to account for the effects of attitudes toward health, domestic values and risk preferences on respondents' preferences for milk, the factors extracted from the factor analysis were incorporated in the RPL model. The factors were extracted as documented in Chapter 5: Health Consciousness, Values and Risk Preference. The factors representing respondents' relative health consciousness, domestic values and risk preferences were interacted with the *100% Canadian milk* attribute. The interaction between the *100% Canadian milk* attribute and health consciousness (Chealth) is expected to be positive. This is based on the premise that health conscious individuals may be inclined to get greater utility from milk with the symbol as it may be perceived as healthier and more nutritious. This is especially so given that Canadian milk is advertised as antibiotic/hormone free and produced under specific health and safety standards.

[29]In this and all subsequent models with interaction terms, the WTP calculations for an attribute that has been interacted only takes into account the coefficients that are significant in influencing preferences.

Health conscious individuals by their nature may seek out this kind of information and therefore exhibit preferences towards the *100% Canadian milk* attribute because it is believed to be healthier than imports. The second interaction term (Cpatriot) captures how respondents' value system and beliefs impact their willingness to pay for milk with the domestic symbol. This coefficient is expected to be negative under the premise that respondents with higher values (as defined by the questions comprising that factor (see section 5.7) will have relatively higher domestic values and patriotic beliefs. In addition, the interaction between risk preference and the *100% Canadian milk* symbol is expected to be positive, under the premise that respondents who are relatively risk averse are expected to pay for the assurance that their dairy products are made from 100% Canadian milk.

Table 6.7 presents the results from the RPL model with the health, values and risk factors. The interactions between the symbol and organic remains positive while the interaction with national brand milk is negative and significant. These results imply that respondents derive positive utility from choosing organic milk with the symbol but negative utility from choosing national brand milk with the symbol, even when controlling for attitudes and beliefs. As previously noted, these findings imply that the symbol and the organic attributes are complements while the symbol and the national brand attribute can be considered as substitutes.

The interaction between the health conscious factor and milk with the *100% Canadian milk* symbol shows that respondents' preferences for milk with the *100% Canadian milk* symbol, is not affected by their level of health consciousness. The interaction between respondents' domestic values and the *100% Canadian milk* attribute is positive and significant at the 1% level of significance. This is unexpected, given that it implies that respondents with "lower" values[30] derive positive utility from milk with the symbol and express willingness to pay a premium of 16 cents for milk with the *100% Canadian milk* attribute as opposed to respondents with higher values. The interaction of risk preferences with the *100% Canadian milk* symbol is positive and significant, indicating that risk averse respondents derive positive utility from choosing milk with the *100% Canadian milk* attribute and are willing to pay a premium of 17 cents.

[30] Note that the interpretation of this variable should be reversed as lower values indicate stronger patriotic values.

It should be noted, however, that the willingness to pay values for the two statistically significant factors (respondents' values and risk preference) are very small (16 and 17 cents respectively) This suggests that there is no great difference between respondents' value of the symbol regardless of whether they have high or low 'patriotism' values and whether or not they are risk averse.

Table 6.7: Milk- RPL with Covariates and Factors

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Org	-.313***	-8.885	-.320***	-3.476
Nat	.12***	0.037	-.043	-.152
Non-random Parameters in Utility Function				
Cand	-0.025	-0.087	-.561	-1.587
CanOrg	.184***	5.474	.457***	5.618
CanNat	-.143***	-4.676	-.355***	-4.663
CanInc	0.000	.208	0.000	0.208
CanEdu	-0.051	-1.516	-0.126	-1.519
CanAge	-.004**	-2.482	-.010**	-2.485
CanGen	-.039	-.647	-.096	-0.647
CanQue	-.24***	-3.135	-.596***	-3.146
CanPrai	-.155*	-1.876	-.384*	-1.873
CanBC	.029	.31	0.072	0.31
CanAtl	-.003	-.028	-.008	-0.028
CHealth	.001	.072	.002	0.072
CPatriot	.063***	5.264	.156***	5.278
CRisk	.069***	2.92	.172***	2.94
Price	-.805***	-18.427	-	-
ASC1	-4.772***	-25.33	-	-
Derived Standard Deviations of Parameter Distributions				
NsOrg	.808***	7.165	-	-
NsNat	.906***	9.645	-	-
Pseudo R^2		0.282		
Log likelihood Function		-3623.05		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

6.4 MNL Results: Ice cream Sample

This section presents the findings from the ice cream survey data. The data was estimated using the MNL and RPL models. The results presented and discussed follow a sequence similar to the milk sample discussion. Therefore, the basic MNL model is first examined. In acknowledging that a less restrictive model such as the RPL model can provide a better fit for the data[31], a series of RPL models are also explored. The estimated models account for two-way interactions between the *100% Canadian milk* attribute and organic and between the *100% Canadian milk* attribute and the national brand attribute. Estimations which account for interactions with covariates and factors are also discussed.

6.4.1 Multinomial Logit (MNL) Main Effects

The main effects MNL model is first estimated to ascertain the impact of the different attribute levels on the choice of ice cream. From this estimation, the pseudo R^2 has an acceptable fit of 0.25 as seen in (Table 6.8); the pseudo R^2 indicates that the model is a relatively good fit for the data. The signs of the attribute coefficients are similar to those resulting from estimating the milk data. These similarities in signs indicate that the impact of the estimated attributes on milk choices affect respondents' choice of ice cream in a similar manner. Specifically, Table 6.8 indicates that respondents derive positive utility from choosing an ice cream alternative with the *100% Canadian milk* attribute and the national brand attribute but negative utility from choosing ice cream with the organic attribute. The WTP column reflects consumers' WTP for each attribute. It can be observed from the first coefficient that respondents were willing to pay a premium of $1.50 for ice cream with the *100% Canadian milk* symbol.

The second coefficient represents ice cream labelled organic, this coefficient is negative and significant which indicates that respondents derive negative utility from organic ice cream relative to conventional ice cream and discount a 2-litre carton of organic ice cream by 46 cents.

[31] After conducting the Hausman test which showed IIA violation. See Appendix K for the Hausman test results.

Positive utility of the same magnitude was however derived from choosing ice cream of a national brand origin. The model also reflects a negative and significant coefficient for price, which indicates that respondents derive disutility from choosing ice cream with higher prices. The ASC1 coefficient is also negative and significant reflecting the disutility derived from not purchasing ice cream as opposed to purchasing ice cream.

Similar to the approach taken with the milk sample, the RPL model is expected to account for heterogeneity in respondents' preferences, different versions of this model are explored next.

Table 6.8: Ice Cream- MNL Main Effects

Variable	Coefficient	T-ratio	WTP	T-ratio
Cand	.728***	29.066	1.504***	27.648
Org	-.221***	-10.153	-.458***	-10.039
Nat	.223***	8.555	.46***	8.725
Price	-.969***	-34.335	-	-
ASC1	-6.73**	-38.406	-	-
Psuedo R^2		0.254		
Log likelihood Function		-3544.35		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

6.5 Random Parameter Logit: Ice cream sample

In an attempt to improve the model fit and account for respondents' preference heterogeneity, the survey data from the ice cream sample was also estimated using the RPL. Similar to the milk sample, the main effects RPL model is first estimated. Extended RPL models that include interaction terms, covariates and factors are provided in subsequent estimations.

6.5.1 Random Parameter Logit Main Effects

In this model, the organic and national brand attributes were specified as random parameters following a normal distribution. The *100% Canadian milk* attribute was also initially included as a random parameter. However, the insignificance of the derived standard deviation of the *100% Canadian milk* attribute variable indicated that this attribute should be estimated as non-random.

The other variables estimated as non-random were price and the alternative specific constant (representing respondents' decisions not to purchase ice cream).

From Table 6.9, it can be observed that results obtained from estimating the main effects RPL model (ice cream) are similar to those obtained from estimating the MNL model: the signs of the coefficients remain the same and the magnitudes are also similar. There are however slight differences: the WTP values for the RPL model are slightly higher for the *100% Canadian milk* attribute. On the other hand, respondents' willingness to pay for national brand ice cream was slightly lower in the RPL model. Specifically, respondents were willing to pay $1.56 extra for a 2-litre carton of ice cream displaying the *100% Canadian milk* symbol as opposed to ice cream without the symbol. In addition, respondents discounted organic ice cream by 48 cents opposed to conventional ice cream but were willing to pay a premium of 43 cents for national brands as opposed to store brands.

In comparing the main effects MNL model and the main effects RPL model, the RPL model appears to represent a better fit for the data in light of the pseudo R^2 values. There is an improvement in the pseudo R^2 from 0.25 in the MNL main effects to 0.30 for the RPL main effects model.

Table 6.9: Ice Cream- RPL Main Effects

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Org	-.294***	-8.387	-.482***	-8.898
Nat	.262***	7.276	.430***	7.453
Non-random Parameters in Utility Function				
Cand	.947***	19.736	1.556***	27.276
PRICE	-1.218***	-22.363	-	-
ASC1	-8.076***	-25.369	-	-
Derived Standard Deviations of Parameter Distributions				
NsOrg	.944***	8.866	-	-
NsNat	.729***	6.727	-	-
Psuedo R^2		0.300		
Log likelihood Function		-3514.51		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

Recall that RPL models facilitate estimating preference heterogeneity. In order to account for differences in respondents' perceptions and preferences, the distribution and the mean of the coefficients of the random variables are used in this process. Table 6.10 presents the results for the preference heterogeneity of the random parameters estimated in the RPL model in Table 6.9. The results from Table 6.10 indicate that most respondents have a negative perception of the organic attribute as it relates to ice cream, as only around 38% of respondents exhibited positive perceptions of organic ice cream. Most respondents exhibited positive perceptions toward national brand ice cream with only 36% indicating negative perceptions.

Table 6.10: Ice Cream- Preference Distribution

Variable	Positive Perception	Negative Perception
Org	37.8%	62.2%
Nat	64.0%	36.0%

6.5.2 Random Parameter Logit with Selected Interactions

The RPL model was re-estimated with the inclusion of interaction terms between the *100% Canadian milk* attribute and the organic attribute (CanOrg) and between the *100% Canadian milk* attribute and the national brand attribute (CanNat). The interactions are expected to reflect how the presence of both attributes as opposed to one affects respondents' preferences and hence choice of ice cream. The results from the model with the two interaction terms are presented in Table 6.11.

It can be observed that the pseudo R^2 slightly increases to .301 in contrast to the model without interactions (Table 6.9), this indicates a marginal improvement in the model fit in comparison to the main effects only RPL model. The results from the model indicate that the interaction between the organic attribute and the *100% Canadian milk* attribute (CanOrg) is insignificant. Unlike the milk sample in which having both attribute levels present had a positive and significant effect on utility. The results also indicate that ice cream choices were unaffected when national brand ice cream also displayed the *100% Canadian milk* symbol. The price coefficient and the ASC1 coefficient remained negative and significant reflecting respondents' disutility from higher prices and from not choosing an ice-alternative respectively.

Table 6.11: Ice Cream- RPL with selected Interactions

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Org	-.285***	-7.877	-.470***	-8.221
Nat	.266***	7.361	.438***	7.508
Non-random Parameters in Utility Function				
Cand	.946***	19.745	1.558***	26.122
CanOrg	-.016	-.478	-.026	-0.479
CanNat	-.032	-.994	-.054	-0.99
Price	-1.215***	-22.145	-	-
ASC1	-8.06***	-25.089	-	-
Derived Standard Deviations of Parameter Distributions				
NsOrg	.929***	8.684	-	-
NsNat	.727***	6.774	-	-
Pseudo R^2		0.301		
Log likelihood Function		-3513.929		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

6.5.3 Random Parameter Logit with Interactions, Covariates and Factors

The next model accounts for differences in as age, income, gender, and education on consumers' on preferences for ice cream with the *100% Canadian milk* attribute. Regional differences in preferences were also evaluated. The results from the RPL model with covariates are depicted in Table 6.12.

The estimated model indicates that consumers in general are willing to pay a $1.58 premium for ice cream with the symbol as opposed to ice cream without the *100% Canadian milk* symbol. As in the previous model, the interaction between the *100% Canadian milk* attribute and organic (CanOrg) and the interaction between the symbol and the national brand attribute (CanNat) has no effect on ice cream choices. Similarly differences in incomes do not appear to influence

respondents' preferences for ice cream with the symbol (CanInc). Also, gender does not account for differences in choosing milk with the symbol.

The results however indicate that respondents with higher education discount the *100% Canadian milk* symbol on ice cream by 13 cents. Older respondents and respondents from the Prairies were willing to pay premiums of .6 cents and 28 cents respectively for the presence of the symbol on a 2-litre container of ice cream. On the other hand, respondents originating from Quebec and British Columbia discount the symbol relative to the base location (Ontario) respondents by 18 and 6 cents respectively. There is no difference in willingness to pay for the symbol between respondents from Atlantic Canada and Ontario. It is of interest to note that the differences in willingness to pay based on region were very small both in relative and absolute terms.

Table 6.12: Ice Cream- RPL Accounting for Socio-Economic and Regional Differences

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Org	-.287***	-7.851	-.467***	-8.219
Nat	.266***	7.291	.433***	7.44
Non-random Parameters in Utility Function				
Cand	.873***	7.572	1.578***	9.114
CanOrg	-.011	-.314	-.018	-0.314
CanNat	-.032	-.976	-.052	-.972
CanInc	0.000	-.795	0.000	-0.795
CanEdu	-.079**	-2.299	-.130**	-2.31
CanAge	.004***	2.848	.006***	2.88
CanGen	.019	.287	.030	0.287
CanQue	-.108	-1.232	-.176	-1.233
CanPrai	.171**	1.923	.278**	1.924
CanBc	-.039	-.417	-.062	-0.417
CanAtl	.074	.611	.12	0.611
Price	-1.228***	-22.012	-	-
ASC1	-8.132***	-24.913	-	-
Derived Standard Deviations of Parameter Distributions				
NsOrg	.936***	8.673	-	-
NsNat	.742***	6.878	-	-
Pseudo R^2		0.303		
Log likelihood Function		-3500.41		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

The next model builds on the RPL models that have been estimated previously by including selected two way interactions between the organic attribute and the *100% Canadian milk* attribute and between the national brand attribute and the *100% Canadian milk* attribute. In addition, covariates and factors representing respondents' health profiles, domestic values and risk preferences (as introduced in Chapter 5) are also included. The results of this model are presented in Table 6.13.

The coefficient representing the interaction between respondents' level of health consciousness and the *100% Canadian milk* attribute (CHealth) is expected to be positive as it was hypothesized that more health conscious respondents would be willing to pay a premium for dairy products with the symbol. The coefficient displays an unexpected sign but is not statistically significant at the 5% level of significance.

The second interaction term of interest captures how respondents' domestic values impact preferences for ice cream with the *100% Canadian milk* attribute. This coefficient is expected to be negative or insignificant based on the hypothesis that respondents with relatively lower domestic values are expected to either discount or be indifferent towards dairy products with the symbol. The coefficient is negative and significant which shows that respondents with lower values discount ice cream with the symbol by 15 cents relative to respondents with higher values.

The coefficient representing the interaction between respondents' risk preferences and the *100% Canadian milk* attribute (Crisk) is expected to be positive based on the premise that risk averse respondents may express willingness to pay a premium for dairy products with the *100% Canadian milk* attribute. The coefficient however turns out to be negative but not significant, which indicates that there is no difference in preferences and willingness to pay for ice cream with or without the symbol across respondents with different levels of risk aversion

Table 6.13: Ice Cream- RPL with Covariates and Factors

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Org	-.283***	-7.884	-.464***	-8.225
Nat	.265***	7.386	.434***	7.547
Non-random Parameters in Utility Function				
Cand	2.406***	7.326	4.09***	7.812
CanOrg	-.01	-.293	-.016	-0.293
CanNat	-.034	-1.061	-.056	-1.057
CanInc	0.000	-.963	0.000	-0.963
CanEDu	-.052	-1.49	-.084	-1.493
CanAge	.001	.628	.002	0.629
CanGen	.028	.423	.046	0.423
CanQue	-.019	-.209	-0.030	-0.209
CanPrai	.203**	2.287	0.334**	2.288
CanBC	.011	.116	.018	0.116
CanAtl	.147	1.209	.24	1.209
CanHealth	-.019*	-1.714	-.032*	-1.708
CanPatriot	-.092***	-6.918	-.152***	-7.039
Crisk	-.032	-1.61	-.052	-1.61
Price	-1.221***	-22.259	-	-
ASC1	-8.085***	-25.207	-	-
Derived Standard Deviations of Parameter Distributions				
NsOrg	.906***	8.534	-	-
NsNat	.698***	6.422	-	-
Pseudo R^2		0.311		
Log likelihood Function		-3463		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

6.6 The Role of Industry Knowledge in WTP for Milk and Ice cream with the 100% Canadian milk symbol.

In Chapter 5, the possibility that consumers' knowledge about the milk and ice cream sectors would significantly influence their attitudes towards the *100% Canadian milk* symbol was

explored. Accounting for respondents' knowledge of the dairy industry is important in assessing willing to pay for the *100% Canadian milk* attribute. For example, it cannot be automatically assumed that because all milk sold in Canada is 100% Canadian, that all consumers should have a willingness to pay of zero for milk with the symbol as in contrast to milk without because: 1) not all respondents/consumers may be aware of this information, and 2) even if there was perfect information there could be other factors affecting preferences for dairy products with the symbol, and 3) if consumers do suspect that even a very small quantity of milk is imported, the symbol could perhaps act as further verification.

In order to verify the role of knowledge in influencing WTP for the *100% Canadian milk* symbol on milk and ice cream RPL models which include an interaction term between respondents' "knowledge" and the *100% Canadian milk* attribute (CanKnw) and main effects were estimated. By incorporating the CanKnw variable in the analysis, the utility derived from purchasing milk and ice cream with the *100% Canadian milk* symbol can be analysed from the perspective of those who are aware that all milk must be Canadian whether or not it displays the label as opposed to respondents who are unaware. In addition, the perspective of respondents who are aware that ice cream can be made from imported milk ingredients as opposed to those who are not aware of this information is evaluated. It should be noted that the interpretation of the knowledge variables is opposite in both samples. In the milk sample the variable is analyzed from the perspective of respondents who are aware that all milk is Canadian, and for ice cream the CanKnw variable captures the perspective of respondents who are aware that ice cream may <u>not</u> be Canadian.

From Tables 6.14 and 6.15, specific focus is directed towards the variable representing the interaction between industry knowledge[32] and *100% Canadian milk* attribute (CanKnw). An interesting observation was made in chapter five; it was noted that almost 50% of respondents to the milk survey were not aware that all milk is Canadian. In addition, approximately 57% of those unaware respondents indicated that they would not change their choices if they knew otherwise. Those respondents who were aware that all milk sold in Canada must be *100%*

[32] The knowledge variable was dummy coded.

Canadian milk discounted milk with the symbol by 55 cents, as indicated by the negative and significant coefficient in Table 6.14. The significant sign of the coefficient is unexpected given that respondents who are aware should rationally be indifferent towards milk with or without the symbol. The signs of the other main effects coefficients remained as in previous estimations, showing that, by controlling for knowledge, while respondents were willing to pay a premium for milk with the *100% Canadian milk* symbol they discounted milk with the organic attribute. Respondents were also willing to pay a premium for national brand milk.

Table 6.14: Milk- RPL Accounting for Knowledge

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Cand	1.02***	14.62	1.939***	14.450
Org	-.274***	-8.59	-.670***	-8.92
Nat	.089**	2.49	.218**	2.468
CanKnw	-.227***	-3.166	-.554***	3.162
Non-random Parameters in Utility Function				
Price	-.818***	-16.853	-	-
ASC1	-4.795***	-24.232	-	-
Derived Standard Deviations of Parameter Distributions				
NsCand	.48***	4.603	-	-
NsOrg	.616***	5.11	-	-
NsNat	.802***	8.019	-	-
NsBCanKnw	.656***	3.454		
Pseudo R^2	0.273			
Log likelihood Function	-3668.924			
***,** and * represent significance at the 1%, 5% and 10% level respectively				

With regards to ice cream, it was observed in Chapter 5 that 72% of respondents were aware that ice cream can be made from imported ingredients. This is not surprising because most products sold in supermarkets are either imported or made from imported ingredients. In this regard the situation with milk is an anomaly, and therefore it is not surprising that more respondents were unaware that almost all milk sold in Canada is Canadian.

Table 6.15 shows that respondents who are aware that ice cream can be made from imported milk ingredients still discounted ice cream with the *100% Canadian milk* symbol by 32 cents relative to respondents who are unaware of this information. This result is rather unexpected given that the *100% Canadian milk* symbol would in this case represent tangible differentiation

between ice cream made from imported milk ingredients and domestic milk. This result however could be explained by whether or not these respondents are concerned about the origin of their foods. With this in mind, the result from the question asking respondents whether or not they are concerned about the origin of food that they purchase was evaluated from the perspective of respondents who are "aware". Figure 6.1 indicates that of the 323 (or 72%) respondents who were "aware", approximately 34% were indifferent about the origin of their food another 25% (strongly agree + agree) indicated that they were not concerned about it, while 41% (disagree + strongly disagree) of respondents indicate that they were concerned about where their food comes from. Clearly, most respondents who are "aware" and unwilling to pay a premium for ice cream with the *100% Canadian milk* symbol are not concerned (given that indifference towards the origin means that it is not important). This partially explains why these respondents are not willing to pay a premium for ice cream with the symbol, although it is still not clear why respondents discounted the ice cream with the symbol.

Table 6.15: Ice Cream- RPL Accounting for Knowledge

Variable	Coefficient	T-Ratio	WTP	T-Ratio
Random Parameters in Utility Function				
Org	-.294***	-8.376	-.48***	-8.89
Nat	.262***	7.266	.428***	7.441
Non-random Parameters in Utility Function				
Cand	1.088***	19.736	1.463***	22.297
CanKnw	-.194***	-2.846	-.318***	-2.864
Price	-1.222***	-22.329	-	-
ASC1	-8.1***	-25.318	-	-
Derived Standard Deviations of Parameter Distributions				
NsOrg	.944***	8.864	-	-
NsNat	.735***	6.776	-	-
Psuedo R^2		0.301		
Log likelihood Function		-3510.37		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

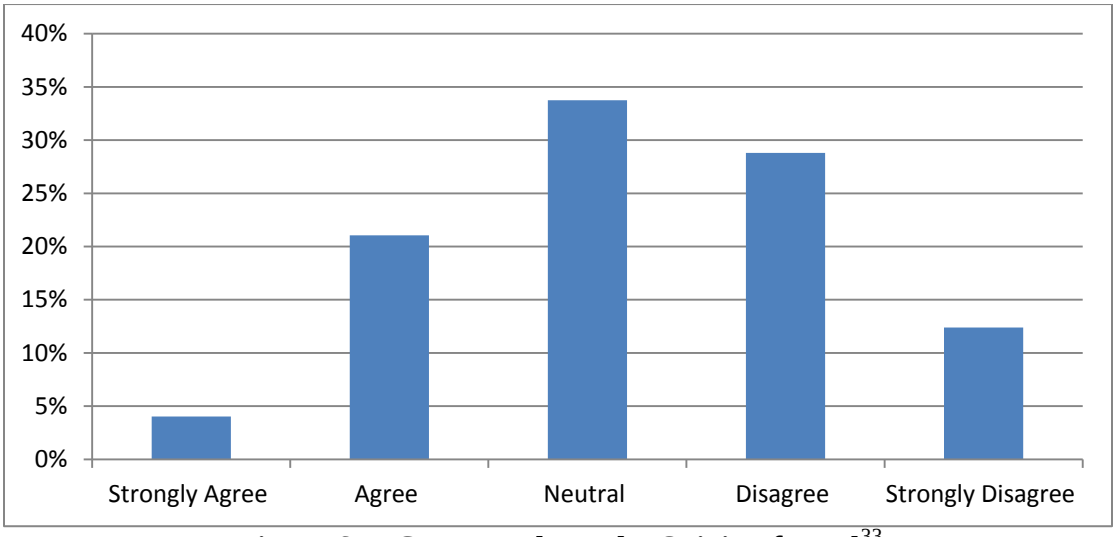

Figure 6.1: Concern about the Origin of Food[33]

Source: Created by author using survey data. Number of respondents = 323.

It can be concluded from the preceding discussion that respondents' knowledge about the milk and ice cream sectors does not seem to positively drive consumers' WTP for the *100% Canadian milk* symbol. On the other hand, WTP is apparently being influenced by the combination of several different factors some of which may be unobserved and therefore not estimable.

6.7 General Results Discussion

The thesis looked at preferences for milk and ice cream with the *100% Canadian milk* symbol as it is interesting to view how respondents' attitudes and preferences towards milk as a product, as opposed to milk as an ingredient in ice cream, differs. Milk is both a "stand alone" product but it is also used as an ingredient in ice cream. Therefore, if the symbol is classified as a brand the relationship between the 100% Canadian milk and ice cream with *100% Canadian milk* symbol can be likened to ingredient co-branding as milk is used to help market ice cream (another product). Therefore, while both are dairy products, consumers may have different perceptions of milk (as a stand-alone product) with the symbol as opposed to ice cream (which contains the milk). Therefore preferences for the milk symbol attribute may be affected by the product on

[33] Based on question 8 in the Patriotism/ Ethnocentrism section-"I am usually **not** concerned about the origin of foods that I purchase"

which it is displayed, hence the interest in estimating preferences for different products with the symbol.

Having estimated various models using both the milk and ice cream data some interesting results were observed as it relates to respondents' preferences. Inferences drawn from the results and extrapolations should however be applied with caution given the caveat that the population of respondents in both samples were older and had higher incomes compared with the Canadian population. In addition, the reliability score of the factor representing respondents' risk perceptions was less than desirable.

With the noted caveats in mind, in general it was observed that the WTP estimates for the various attributes were more conservative in both absolute and relative terms for the ice cream sample than the milk sample. Although the prices within the different ice cream choice sets were higher than those for milk, per unit WTP estimated for the different attributes were higher for milk. Notably, respondents were willing to pay $2.09 per 2-litres for the *100% Canadian milk* attribute in milk but $1.50 per 2- litres in ice cream. Similarly, in the main effects RPL, respondents were willing to pay $2.20 for the *100% Canadian milk* attribute in milk as opposed to $1.56 in ice cream. The observed results could have different possible explanations. First it can be deduced that respondents have a greater value for milk with this attribute because in general it contains no other modified ingredients as opposed to ice cream comprised of several different ingredients. Therefore paying a premium for the assurance that ice cream is made from 100% Canadian milk provides no assurance that the other ingredients in the product are acceptable. Milk is different as there are no additional ingredients.

Another possible explanation for the relatively high WTP estimates is that the milk estimations were less reliable relative to the ice cream estimations especially given the fact that the pseudo R^2 values were better for the ice cream data than the milk data. Also, it was observed in Chapter 5 that the milk respondents were less knowledgeable about the milk sector relatively to ice cream respondents. This lack of knowledge may have created some amount of bias in the WTP estimates. Approximately 25 percent of respondents indicated that their choice selections would have been different if they were more knowledgeable about the milk sector.

The estimated models (both for milk and ice cream) indicated that respondents discounted the organic attribute. This result was quite unexpected as there are several studies suggesting that consumers are in general willing to pay premiums for an organic attribute. For example, in a study conducted between 2004 and 2005, Bernard and Bernard (2009) observed that US consumers were willing to pay a premium for organic milk. Experimental auctions were used to obtain information on preferences from 154 respondents from four US states, (Delaware, Maryland, Pennsylvania, and New Jersey). Participants were allowed to bid for milk of four varieties: conventional, organic, rBST-free, and no use of antibiotics. In general, the bids were greatest for organic milk as opposed to the other type of milk auctioned. It was however noted that there was decreasing marginal WTP for additional organic attributes as the willingness to pay for rBST-free, and no use of antibiotics attributes combined were greater than the willingness to pay for the organic attribute itself even though they are component attributes of the organic attribute. Furthermore, the implied comparison of organic milk with rBST-free milk (rBST is not approved for use in Canada) comprises a different choice context than the current study, which may in part explain the difference in results.

In addition, a study conducted by Akaichi, Nayga and Gil (2012) using Multiunit Vickrey auctions and respondents from Spain shows that respondents were willing to pay for organic milk. In this experiment, different units of organic milk were auctioned. It was however noted that WTP decreased with the number of units of milk purchased.

Although the highlighted studies revealed a willingness to pay a premium for organic milk, it should be noted that: 1) these studies did not take into consideration negative bids, 2) not 100% percent of consumers were willing to pay a premium for organic milk, similarly, not all Canadian respondents dislike organic milk and ice cream, and 3) the policies governing the milk industry in these countries are different from the Canadian industry and respondents are most likely culturally different. Therefore, the perspectives of Canadian consumers may be different.

It should be noted that while the use of rBST was highlighted in the studies above, the current study only examines trade-offs between organic and conventional milk/ice cream. Therefore, it is

expected that the willingness to pay values for organic in the highlighted studies would be greater than the current study. Also, given that the policies governing the milk (dairy) sector in countries such as the US and Spain are different than that of Canada, consumers could also have differing perspectives towards the value of organic dairy products. The policies governing the production and importation of milk and dairy products in the US are less rigid than those of Canada. For example, the use of rBST has been approved for use in the United States by the U.S. Food and Drug Administration since 1993 (Bernard & Bernard, 2009). The same hormone is not approved in Canada and cannot be used to enhance the production of milk in cows. Therefore there may be a market for rBST free milk in the US and a larger market for organic milk. In addition the majority of dairy farms in Canada are small family farms whereas the United States dairy farms are larger, often industrial-like farms. Therefore, consumers who are adequately informed could place a greater value on "organic" milk sold in the US as opposed to "organic" milk sold in Canada.

Regardless of these points however, a negative WTP is still surprising as there exists a market for organic milk. In addition only 16 percent of respondents in the milk survey and 13 percent in the ice cream survey indicated that they usually (always + most of the time)[34] purchase food labelled natural or organic. Also over 85 percent of respondents indicated that they never purchase national/store brand milk labelled as organic. Similarly, 88 percent of respondents indicate that they never purchase national/store brand ice cream labelled as organic.[35]

There may also be other possible explanations specific to this study which resulted in respondents discounting organic milk and ice cream. One possible explanation could be that the inclusion of one attribute overshadowed and dominated the milk choices. Specifically, the *100% Canadian milk* attribute may have taken precedence in the mind of respondents, hence the high willingness to pay for this attribute and the negative willingness to pay for the organic attribute.

[34] Based on question 4 in the survey section on "Consumer Health Profile"- How often do you purchase food labelled as Natural or Organic?

[35] Based on question 2 in the survey section on "Awareness and brand Preference"- On a scale of 1 to 5, in a typical month how often do you purchase MILK with the following labels?

Estimations showed that respondents to the milk survey who are aware that milk is Canadian whether or not it displays the *100% Canadian milk* symbol tended to discount milk with the symbol. Rationally, it was expected that respondents would be indifferent between milk with and without the symbol given that they are the same. Respondents may have been reacting negatively to the presence of a label that they deemed unnecessary. On the other hand, ice cream respondents who were aware that ice cream can be made from imported modified ingredients still discounted ice cream with the *100% Canadian milk* symbol. This result was unexpected. Further analysis revealed that on average these respondents were not particularly concerned about the origin of their food products.

6.8 Chapter Conclusion

The 100% Canadian milk symbol was introduced in 2009 with the aim of explicitly informing consumers about the origin of milk in their dairy products. Because consumers have different preferences the importance or value placed on origin information is expected to differ based on consumer groups. Products also vary on many levels which can result in differences in preferences for the same attribute depending on the product in which it is embedded. Therefore, the factors influencing willingness to pay for Canadian origin information on milk and ice cream were explored. Chapter 6 embarked on various estimations with the intention of answering the research objectives as described in Chapter 1 with the focus on two dairy products: milk and ice cream. The two products, while different, are similar in that milk is an ingredient of ice cream. Hence the estimations were able to highlight willingness to pay for milk as a product and milk as an ingredient with emphasis on the *100% Canadian milk* attribute. Six different estimations for each sample were used to show how willingness to pay is affected by different factors such as the presence of other attributes, and socio-demographics. Both the basic Multinomial Logit (MNL) and the more advanced Random Parameter Logit (RPL) models were estimated. The RPL models addressed the limitations of the MNL and represented a better fit for the data as identified by significant improvements in goodness of fits.

While the MNL models presented robust results the level of significance as indicated by the pseudo R^2 were low, especially in the case of the milk sample. The RPL analysis however proved to have greater explanatory power and was able to account for heterogeneity in

preferences towards the various attributes. In general respondents showed strong preferences towards the *100% Canadian milk* attribute and the national brand attribute but significantly discounted the organic attribute when choosing either milk or ice cream. The effect of attribute combination, socio-demographics and dairy industry knowledge were also observed to be influential factors in milk and ice cream choices.

The estimations indicated that respondents' preferences for attributes of milk and ice cream were similar, as the RPL models indicated that respondents were willing to pay a premium for the *100% Canadian milk* symbol on both milk and ice cream but discounted organic milk and ice cream. The utility derived from choosing national brand milk or ice cream was positive. On the other hand, combining the national brand attribute with the *100% Canadian milk* symbol showed that the two attributes are substitutes for one another in milk choices but had no impact on ice cream choices.

The RPL models showed that there were no significant differences in preferences for milk with the *100% Canadian milk* symbol based on age, income and gender. However, differences in educational levels and respondents' location affected preferences. While respondents' levels of education, age and location affected their willingness to pay for ice cream with the symbol, income and gender did not significantly account for differences in willingness to pay.

The effect of respondent's knowledge of the milk and ice cream sectors was also evaluated, but it appeared to be inconsequential in explaining attitudes and preferences toward the *100% Canadian milk* symbol. This was especially true in the case of ice cream where respondents who were aware that ice cream can be made from imported modified milk ingredients (as opposed to those who were unaware) discounted ice cream with the *100% Canadian milk* attribute, which in effect guarantees that the ice cream contains milk of Canadian origin as opposed to imported milk ingredients. The following chapter provides the conclusions to the thesis and discusses the implications of the results.

Chapter 7: Conclusions & Implications

Consumers' product perceptions and willingness to pay stem from two main sources: product attributes and individual characteristics (Hensher et al. 2005). This study examined how preferences for milk and ice cream are influenced by the 100% Canadian milk symbol, consumers' attitudes and socio-demographics. This study not just adds to those that have examined Canadian consumers' perceptions and willingness to pay for attributes of dairy products, it is the first to examine perceptions and willingness to pay for the *100% Canadian milk* attribute. Furthermore, the influence of other attributes such as brand (national versus store), milk type (conventional versus organic), and the effects of individual factors (such as age, income, gender and education) on preferences for milk and ice cream with the *100% Canadian milk* attribute were evaluated. Data was gathered through a nationwide internet survey administered in both English and French. The information gathered was estimated using different versions of the basic Multinomial Logit (MNL) and the Random Parameter Logit (RPL) models. The estimations accounted for main effects and interaction effects. Estimations included interactions between the *100% Canadian milk* attribute and other attributes, (organic and national brand), and socio-demographic and attitudinal variables, with the *100% Canadian milk* symbol being the focal point of the study

The 100% Canadian milk symbol was introduced in 2009. The symbol appears on several dairy products throughout Canada, including milk. The study theorized that there are several factors that may affect preferences and consumers' willingness to pay for the *100% Canadian milk* attribute such as consumers' patriotic values, risk preferences and their level of health consciousness. Secondarily, the effect of respondents' knowledge about the dairy industry on their perceptions and willingness to pay was also explored. Specifically, the primary objectives of this study were to:

1) Assess the attributes/factors affecting consumers' preferences for milk and ice cream.
2) Ascertain Canadian consumers' willingness to pay for milk and ice cream with the *100% Canadian milk* symbol.
3) Ascertain how WTP is moderated by individual characteristics: patriotic values, health consciousness and risk perceptions.
4) Identify potential target markets for co-branded dairy products based on socio-demographic and socio-economic characteristics.

This chapter examines in turn how these objectives were met by summarizing the findings of the study and highlighting inferences that can be drawn from the findings. In addition, implications of the findings for the Canadian industry and milk supply chain are also discussed. The chapter closes with a discussion of the limitations inherent to the research methodology and recommendations for further research.

The choice experiment used to elicit preferences included four alternatives and four attributes: national brand milk versus store brand, organic versus conventional, *100% Canadian milk* symbol versus no symbol and price. Over 90% of respondents indicated that they were aware of the *100% Canadian milk* symbol. However, there were mixed perceptions towards products with the symbol versus products without, although estimations show that consumers were in general willing to pay a premium for products with the symbol. The general results from the MNL models for both the milk and ice cream samples indicated that consumers on average derive negative utility from choosing organic milk but positive utility from national brand milk. In addition, respondents derived positive utility from choosing organic milk that also displayed the symbol. There was disutility from choosing national brand milk with the symbol. There was however no difference in WTP for organic or national brand ice cream with the symbol as these coefficients were found to be statistically insignificant.

To further evaluate attribute preferences respondents were also asked to indicate other factors that are important when purchasing milk or ice cream. From a list of eight characteristics that consumers may take into consideration when making a purchase, milk respondents considered expiry date, price and taste to be the three most important (in that order). On the other hand, respondents considered taste, price and fat content to be the three most important factors when purchasing ice cream.

The study also examined how WTP for milk and ice cream is moderated by respondents' level of health consciousness, patriotic values and risk preferences. These attitudinal factors were extracted with the use of SPSS and interacted with the *100% Canadian milk* attribute. From these interactions it was possible to ascertain how perceptions for milk and ice cream with the symbol

are altered by these characteristics. Although respondents in general expressed WTP for the symbol, some characteristics believed to positively influence preferences did not in the case of milk and ice cream. Specifically, it was hypothesized that respondents who were relatively more health consciousness, patriotic and risk averse would be willing to pay a premium for products with the symbol. The results showed that respondents' level of health consciousness was insignificant in influencing preferences for milk with the symbol but marginally significant in negatively influencing preferences for ice cream. Although the interaction between respondents' patriotic values and the symbol was significant, the sign for the interaction led to the rejection of the hypothesis that more patriotic respondents are willing to pay a premium for milk with the symbol. However, in the case of ice cream patriotic respondents were willing to pay marginally more for ice cream with the symbol. Respondents who were relatively more risk averse were willing to pay a marginal premium for milk with the symbol, whereas, respondents' risk aversion did not influence WTP for ice cream with the symbol.

The literature on consumer behaviour and willingness to pay suggests that purchasing decisions, and by extension, willingness to pay are influenced by several different factors. Within this study the impact of respondents' characteristics on willingness pay for dairy products with the *100% Canadian milk* symbol were identified by estimating RPL models. The RPL models also exhibited heterogeneity in preferences. The interactions of the *100% Canadian milk* symbol with covariates indicated that individual respondent characteristics were important in influencing preferences for milk and ice cream with the symbol. Respondents exhibited differences in willingness to pay when choosing milk based on their level of education and location (region). In addition to education and location, age influenced preferences for ice cream with the symbol. Income and gender were insignificant in influencing preferences for both products.

Of secondary interest, this study also assessed the role of industry knowledge in accounting for differences in willingness to pay for milk and ice cream with the symbol. The results showed that respondents who were aware that all milk sold in Canada must be 100% Canadian discounted milk displaying the *100% Canadian milk* symbol. With respect to ice cream, respondents who are aware that ice cream can be made from imported milk ingredients also tended to discount ice cream with the symbol relative to those who are not aware.

Overall the results indicate that preferences for the 100% Canadian milk symbol are influenced by many factors. It was also observed that the impact of the different factors depends on the product in which *100% Canadian milk* attribute is embedded. While respondents' level of patriotism, health conscious and risk preference may influence preferences for the symbol, these factors did so only marginally. It also appears that the *100% Canadian milk* symbol tended to elicit higher WTP from consumers who were less informed about the Canadian dairy sector.

7.1 Implications of the Findings

Consumers' perceptions milk and ice cream with the 100% Canadian milk symbol have implications for the Canadian dairy industry and the supply chain. Results from this study can be used, to some extent, to guide marketing decisions based on regional differences and types of consumers.

Although most respondents were aware of the 100% Canadian milk symbol, respondents also revealed mixed perceptions towards milk and ice cream with the symbol as some respondents indicated their indifference towards milk and ice cream with the symbol. The implication of this observation is that the dairy industry can work to achieve greater domestic loyalty as strong loyalty towards the symbol will likely result in greater consensus regarding preferences for the symbol. Furthermore, the results in general suggest that consumers on average derived positive utility from milk and ice cream with the *100% Canadian milk* symbol. In light of this, there is a potential for the milk supply chain and particularly processors to extend the "branding" initiative to other products made from milk by-products such as frozen pizzas and other "ready to eat food". Such an initiative could further promote awareness and strengthen loyalty towards domestic dairy products. This initiative is potentially important to the dairy industry as a pre-emptive measure should changes to the current supply management system occur in the future[36]. Should this system be dismantled (partially or fully), the 100% Canadian milk symbol would

[36] The supply management system was adopted in the early 1970s. Under this system a combination of prohibitive taxes and import restrictions prevent the sale of imported fluid milk and restrict the importation of other commercial dairy products.

have greater success and significance if consumers are aware of the symbol and have loyalty towards the symbol. This could be beneficial to dairy farmers and processors.

Results from the study indicated the relative importance of some characteristics when consumers consider purchasing milk or ice cream. It was noted that consumers' preferences toward these characteristics were heterogeneous. Processors could use information on the three most important characteristics to ensure that they are satisfying the needs of consumers. For example, given that respondents considered taste as an important factor, processors should at all times ensure that their dairy products meet Canadian consumers' taste preferences.

In addition, results from the RPL models indicated that the symbol is a substitute for national brand dairy products and a complement for store brand products. The presence of the symbol also adds value to organic milk. These results would therefore imply that companies manufacturing organic milk can benefit by forming brand alliances with Dairy Farmers of Canada for marketing purposes. However, an implication of forming brand alliances is that an alliance with a poorly perceived brand could potentially result in brand dilution. Therefore, while increasing awareness towards the symbol is potentially beneficial, precautions should also be taken to ensure that the image of the 100% Canadian milk brand is not negatively affected. One way to guard against this is by forming alliances with brands that are already strong and have in place good quality assurance measures. Such an initiative can serve as a pre-emptive measure in gaining in building a strong image and hence securing consumers' loyalty.

Information on how respondents' level of health consciousness, values and risk preferences impact their willingness to pay for milk and ice cream with the 100% Canadian milk symbol is potentially useful. As a marketing strategy, consumers can be targeted based on these attitudinal relationships (health consciousness, values and risk preferences) in order to increase consumers' brand loyalty and brand awareness.

Specifically, in order to target consumers based on their attitudes towards health, emphasis can be placed on the health benefits derived from consuming dairy products in general, with specific focus on products with the 100% Canadian milk symbol. Also, given that respondents' views and

values affect their preferences for dairy products with the symbol, greater emphasis could also be placed on the importance of origin information and why this should be of interest to consumers. In addition, to target respondents based on their level of risk preference, marketing measures geared toward highlighting the safety standards involved in processing Canadian milk may appeal to this group of consumers. Specifically, explicit distinction can be made between Canadian milk and imported milk by highlighting the fact that the use of rBST has not been approved for use in Canada as opposed to other large scale milk producing countries such as the United States. It however appears from the results that such a marketing strategy would be more effective for fluid milk than for ice cream.

7.2 Research Limitations & Future Studies

Characteristic to any study are limitations. The stated preference method that was used to obtain choice data from respondents has inherent limitations. Given that the choice questions were based on hypothetical scenarios, respondents' choices may not truly reflect how they would actually behave in real market settings as choices were non-binding. To mitigate this hypothetical bias, a "cheap talk script" was included in the survey. The cheap talk script informed respondents of the concern about their choices in the choice scenarios not reflecting their true preferences and the importance of selecting choices as they would in real situations. Research has shown that cheap talk scripts can be an effective way of reducing hypothetical bias (Lusk, 2003). Nevertheless, the expressed preferences and WTP estimations may suffer from a degree of hypothetical bias. In addition, it is possible that the high degree of preferences exhibited towards the *100% Canadian milk* symbol may be a function of what respondents believed to be appropriate choices based on the overall objective of the survey.

An additional limitation is evident from the way the sample was selected. Although the survey samples drawn from the general population provided a good representation of the regional distribution of the Canadian population and on other demographic characteristics, the recruitment method cannot be considered as random as respondents were recruited by a survey company from an online panel. Therefore extrapolating findings to the average Canadian should be done with caution. It should also be noted that the reliability of the third factor representing risk was

low. The Cronbach's alpha was below .6 in both the milk and ice cream factor analysis. This was perhaps caused by the number of variables that were retained in that factor.

Lastly, although this study considered four attributes of milk, other attributes such as milk fat content and nutritional content may of course also be important determinants of dairy product choices. Also, it should be noted that the attributes used in this choice model were by necessity rather generic, therefore, the results may be limited in their applicability. For example, store brand and national brands were defined broadly which makes it difficult to capture loyalty to specific brands, although this was not germane to the study objectives.

Further research is needed in this area using different groups of dairy products to extend the generalizability of the reported findings. In addition, different models such as the latent class method could also be used to further examine heterogeneity across consumer segments. Perhaps this could provide more information on preferences towards the organic attribute. The latent class method would show how classes of respondents differ in terms of preferences for products with 100% Canadian milk symbol.

In addition, further research in this area could employ an experimental auction method in which choices are made binding. This would perhaps result in more conservative WTP estimates for the *100% Canadian milk* attribute. Furthermore, the same respondents could be used in an experimental auction featuring both milk and ice cream with the symbol. This would perhaps accommodate deeper analysis of how perceptions differ across both products from the perceptive of the same group of individuals. Further modifications could also include the use of different information treatments to account for respondents' knowledge of the dairy industry. Specifically, two survey treatments could be administered for each product, one in which respondents were informed about the dairy industry before responding to the choice section of the survey and one where they received the information after (as in this study). This would perhaps provide a better indication of the bias caused by respondents' knowledge of the dairy sector.

References

Adamowicz, W., Louviere, J., & William, M. (1994). Combining Revealed and Stated Preference Methods for Valuing Environmental Amenities. *Journal of Environmental Economics and Management, 26*(3), 271-292.

Agriculture and Agri-Food Canada. (2009a, February 2). *Canadian Consumers*. Retrieved October 8, 2012, from Agriculture and Agri-Food Canada: http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1170942402619&lang=eng#n13

Agriculture and Agri-Food Canada. (2009b, December). *Branding Matters: Agriculture and Agri-Food Canada*. Retrieved September 30, 2011, from Agriculture and Agri-Food Canada: http://www.marquecanadabrand.agr.gc.ca/news-nouvelles/5348-eng.htm

Agriculture and Agri-Food Canada. (2009c). *Global Private Label Trends*. Ottawa: Agriculture and Agri-Food Canada.

Agriculture and Agri-Food Canada. (2011, July 14). *Local food favoured, but not if it costs more: AgCanada*. Retrieved August 23, 2011, from Agriculture and Agri-food Canada: http://agcanada.com/Article.aspx?ID=38505

Agriculture and Agri-Food Canada. (2012a, December 18). *Canada Brand: What is it?* Retrieved March 10, 2013, from www.canadabrand: http://www.marquecanadabrand.agr.gc.ca/what-quoi/what-quoi-eng.htm

Agriculture and Agri-Food Canada. (2012b, August 8). *Canada Brand: How to use it*. Retrieved March 10, 2013, from www.canadabrand.agr.gc.ca: http://www.marquecanadabrand.agr.gc.ca/how-comment/how-comment-eng.htm

Akaichi, F., Nayga, R. M., & Gil, J. M. (2012). Assessing Consumers' Willingness to Pay for Different Units of Organic Milk: Evidence from Multiunit Auctions. *Canadian Journal of Agricultural Economics, 60*(4), 469-494.

Alberta Agriculture and Rural Development. (2011, March 09). *Consumer Trends in Food Safety*. Retrieved August 23, 2011, from Alberta Agriculture and Rural Development: http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sis8437

Alberta Livestock and Meat Agency (ALMA). (2012, August). *Alberta Livestock and Meat Agency: Industry Development*. Retrieved March 10, 2013, from http://alma.alberta.ca: http://alma.alberta.ca/cs/groups/alma/documents/document/mdaw/mdex/~edisp/agucmint-011803.pdf

Anderson, J. C., & Gerbing, D. W. (1982). Some Methods for Respecifying Measurement Models to Obain Unidementional Construct Measurement. *Journal of Marketing Research, 19*(4), 453-460. Retrieved May 06, 2012, from http://www.jstor.org/stable/10.2307/3151719

BBC News Europe. (2011, June 10). *German tests link bean sprouts to deadly E. coli*. Retrieved March 12, 2012, from BBC News Europe: http://www.bbc.co.uk/news/world-europe-13725953

BBC News Wales. (2010, November 23). *E. coli outbreak butcher 'sold rotten meat for years'*. Retrieved August 21, 2011, from BBC News Wales: http://www.bbc.co.uk/news/uk-wales-11814600

Bech, M., & Gyrd-Hansen, D. (2005). Effects coding in discrete choice experiments. *Journal of Health Economics, 14*(10), 1079–1083. Retrieved May 07, 2012, from http://onlinelibrary.wiley.com/doi/10.1002/hec.984/abstract

Bech-Larsen, T., & Grunert, K. G. (2003). The perceived healthiness of functional foods A conjoint study of Danish, Finnish and American consumers' perception of functional foods. *Appetite, 40*(1), 9–14.

Bernard, D. J., & Mathios, A. (2005). Factors Affecting Consumers Choice and Willingness to Pay for Milk Attributes. *American Agricultural Economics Association Annual meeting* (pp. 1-34). Providence: American Agricultural Economics Association. Retrieved from http://purl.umn.edu/19366

Bernard, J. C., & Bernard, D. J. (2009). What Is It About Organic Milk? An Experimental Analysis. *American Journal of Agricultural Economics, 91*(3), 826-836.

Bredahl, L. (2004). Cue utilisation and quality perception with regard to branded beef. *15*(1), 65-75.

Cakir, V. (2008). *The Relation of Knowledge of Made In Between Brand Attitude and Willingness to Purchase*. Retrieved 07 07, 2012, from cim.anadolu.edu.tr/pdf/2008/2008_881-896.pdf

Canadian Dairy Information Centre (CDIC). (2012a, July 11). *Canadian Dairy Information Centre (CDIC): Dairy Facts and Figures*. Retrieved August 18, 2011, from Canadian Dairy Information Centre (CDIC): http://www.dairyinfo.gc.ca/index_e.php?s1=cdi-ilc

Canadian Dairy Information Centre (CDIC). (2012b, March 1). *Consumption of Dairy Products*. Retrieved October 5, 2012, from Canadian Dairy Information Centre: http://www.dairyinfo.gc.ca/index_e.php?s1=dff-fcil&s2=cons&s3=cons

Canadian Dairy Information Centre (CDIC). (2013, April 17). *Canadian Dairy Information Centre: Canadian Dairy Trade Balance*. Retrieved from Canadian Dairy Information Centre: http://www.dairyinfo.gc.ca/index_e.php?s1=dff-fcil&s2=imp-exp&page=bal

Canadian Dairy Information Centre (CIDC). (2012c, June 25). *Number of Farms, Dairy Cows and Dairy Heifers*. Retrieved from Canadian Dairy Information Centre: http://www.dairyinfo.gc.ca/index_e.php?s1=dff-fcil&s2=farm-ferme&s3=nb

Canadian Food Inspection Agency. (2011, December). *Food Safety Investigations: Canadian Food Inspection Agency*. Retrieved September 15, 2012, from Canadian Food Inspection Agency: http://www.inspection.gc.ca/food/information-for-consumers/food-safety-investigations/progress-on-food-safety/weatherill-report-recommendations/eng/1362425366007/1362425780005

Canadian Partnership for Consumer Food Safety Education. (n.d.). *Food Safety Tips facts Sheet*. Retrieved March 15, 2012, from Canadian Partnership for Consumer Food Safety Education: http://www.canfightbac.org/cpcfse/en/safety/safety_factsheets/foodborne_illness/

Canadian Wheat Board (CWB). (2011, June 23). *CWB: Newsroom*. Retrieved March 8, 2013, from http://www.cwb.ca: http://www.cwb.ca/public/en/newsroom/releases/2011/news_release.jsp?news=062311.jsp

Centers for Disease Control and Prevention. (2006, October 6). *Update on Multi-State Outbreak of E. coli O157:H7 Infections From Fresh Spinach, October 6, 2006*. Retrieved from Centers for Disease Control: http://www.cdc.gov/foodborne/ecolispinach/100606.htm

Centers for Disease Control and Prevention. (2007, June 1). *Multistate Outbreak of Salmonella Serotype Tennessee Infections Associated with Peanut Butter --- United States, 2006--2007*. Retrieved March 19, 2012, from Centers for Disease Control and Prevention: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5621a1.htm

Centers for Disease Control and Prevention. (2010, December 2). *Investigation Update: Multistate Outbreak of Human Salmonella Enteritidis Infections Associated with Shell Eggs*. Retrieved Febuary 12, 2012, from Centers for Disease Control and Prevention: http://www.cdc.gov/salmonella/enteritidis/

Centers for Disease Control and Prevention. (2012, February 1). *Investigation Update: Multistate Outbreak of Human Salmonella Typhimurium Infections Linked to Ground Beef*. Retrieved

March 6, 2012, from Centers for Disease Control and Prevention: http://www.cdc.gov/salmonella/typhimurium-groundbeef/020112/index.html

Champ, P. A., Boyle, K. J., & Brown, T. C. (2003). *A Primer On Nonmarket Valuation.* Dordrecht: Kluwer Academic Publishers.

Chang, W.-L. (2008). A Typology of Co-branding Strategy: Position and Classification. *Journal of American Academy of Business, 12*(2), 220-226.

Chen, H.-L. (2011). Effects of Country-of-Origin, Consumer Patriotism, and Values on Brand Strength: A Multi-attribute Setting. *Management and Economics IPEDR, 3*, 267-272.

Costello, A. B., & Osborne, J. W. (2005). Practical Assessment Research & Evaluation. *ISSN 1531-7714, 14*(20), 1-11. Retrieved May 06, 2012

Cronbach, L. (1951). Coefficient Alpha and the Internal Structure of Tests. *Psychometrika, 16*(3), 297-334. Retrieved May 06, 2012

Dairy Farmers of Canada (DFCa). (n.d.). *Campaigns: Dairy Farmers of Canada*. Retrieved May 2, 2011, from Dairy Farmers of Canada: http://www.dairyfarmers.ca/news-centre/campaigns/100-canadian-milk

Dairy Farmers of Canada (DFCb). (n.d.). *Dairy Farmers of Canada: Our Economic Contribution*. Retrieved August 23, 2011, from Dairy Farmers of Canada: http://www.dairyfarmers.ca/what-we-do/our-economic-contribution

Dairy Farmers of Ontario. (2009, January 14). Retrieved 30 September, 2011, from Dairy Farmers of Ontario: http://www.marketwire.com/press-release/diary-farmers-of-ontario-100-canadian-milk-branding-program-announced-937903.htm

Dairy Goodness.ca. (n.d.). *What the symbol stands for*. Retrieved July 27, 2011, from Dairy Goodness.ca: http://www.dairygoodness.ca/100-percent-canadian-milk/about-the-100-percent-canadian-milk-symbol/what-the-symbol-stands-for

Darren, G., & Mallery, P. (2003). SPSS for Windows Step by Step: A Simple Guide and Reference. Allyn and Bacon, 2003.

De Chernatony, L. d., & Riley, F. D. (1998). Defining a "Brand" : Beyond the Literature with Experts' Interpretation. *Journal of Marketing Management, 14*(5), 417-443.

Detoni, D., Tonsor, G. T., Calantone, R. J., & Peterson, H. C. (2009). The Direct and Indirect Effects of "Locally Grown" on Consumers'Attitudes towards Agri-Food Products. *Agricultural and Resource Economics Review, 38*(3), 384-396.

Fox, J. A., Hayes, D. J., & Kliebenstein, J. B. (1994). Consumer Acceptability of Milk from Cows Treated with Bovine Somatotropin. *Journal of Dairy Science, 77*(3), 703-707.

Fox, J. A., Shogren, J. F., Hayes, D. J., & Kliebenstein, J. B. (1995). Experimental Auctions to Measure Willingness to Pay for Food Safety. In J. A. Fox, J. F. Shogren, D. J. Hayes, & J. B. Kliebenstein, *Valuing Fod Safety and Nutrition* (pp. 115-128). Colorado: Westview Press.

Froehlich, E. J., Carlberg, J. G., & Ward, C. E. (2009). Willingness-to-Pay for Fresh Brand Name Beef. *Canadian Journal of Agricultural Economics, 57*(1), 119-137.

Geylani, T., Ter Hofsted, F., & Inman, J. J. (2005). Image Reinforcement or Impairment: The Effects of Co-Branding on Attribute Uncertainty. *Marketing Science, 27*(4), 730-744.

Grebitus, C., Menapace, L., & Bruhn, M. (2011). Consumers ' Use of Seals of Approval and Origin Information: Evidence From the German Pork Market. *Agribusiness, 27*(4), 478-492.

Groves, M. (1996, November 9). *Child's Death Linked to E. Coli From Apple Juice*. Retrieved June 22, 2012, from Los Angles Times: http://articles.latimes.com/1996-11-09/business/fi-62903_1_apple-juice

Halbrendt, C., Pesek, J., Parsons, A., & Lindner, R. (1995). Contingent Valuation of Consumers' Willingness to Purchase Pork with Lower Saturated Fat. In *Valuing Food Safety and Nutrition* (pp. 319-339). Colorado: West View Press.

Hammitt. (1993). Consumer Willingness to Pay to Avoid Pesticide Residue. *Statistica Sinica, 3*, 351-366.

Helmig, B. H.-A., & Leeflang, P. (2008). Co-branding: the State-of-the-Art. *Schmalenbach Business Review, 60*, 359-377.

Hensher, D. (2010). Hypothetical bias, choice experiments and willingness to pay. *Transportation Research Part B: Methodological, 44*(6), 735-752.

Hensher, D., Rose, J. M., & Greene, W. H. (2005). *Applied Choice Analysis.* New York: Cambridge University Press.

Heslop, L. A., & Sprott, E. (2007). *Literature Review of Canadian Consumer Attitudes and Perceptions.* Agriculture and Agri-Food Canada, Agriculture, Ottawa. Retrieved December 15, 2012, from http://www.marquecanadabrand.agr.gc.ca/domestic-nationale/6303-eng.htm

Heslop, L., & Wall, M. (1986). Two Views of the world: Differences Between Men and Women on Perceptions of Countries as Producers of Consumer Goods. *Marketing (Whistler, BC: Proceedings, Administrative Sciences Association of Canada-Marketing Division), 7*, 179-185.

Hobbs, J. E., Bailey, D. V., Dickinson, D. L., & Haghiri, M. (2005). Traceability in the Canadian Red Meat Sector: Do Consumers Care? *Canadian Journal of Agricultural Economics, 53*, 47-66.

Hobbs, J. E., Sanderson, K., & Haghiri, M. (2006). Evaluating Willingness-to-Pay for Bison Attributes: An Experimental Auction Approach. *Canadian Journal of agricultural Economics, 54*(2), 269-287.

Hu, W. H., Veeman, M. M., & Adamowicz, W. L. (2005). Labelling Genetically Modified Food:Heterogeneous Consumer Preferences and the Value of Information. *Canadian Journal of Agricultural Economics, 53*(1), 83-102.

Hu, W., Adamowicz, W., & Veeman, M. (2006). Labeling Context and Reference Point Effects in Models of Food Attribute Demand. *American Journal of Agricultural Economics, 39*(3), 1034-1049.

Huang, C. L. (1993). Simultaneous Equation Model for Estimating Consumer Risk Perceptions, Attitudes and Willingness-to-pay for Residue-free Produce. *Journal of Consumer Affairs, 27*(2), 377-396.

Innes, B., Kerr, W. A., & Hobbs, J. E. (2005). International Product Differentiation Through Country Brand: An Economic Analysis of National Branding as a Marketing Strategy for Agricultural Products. Saskatoon: Canadian Agriculture Trade Policy Network.

Johnson, C. (2005, April 8). *New Thoughts For Food: What Do Consumers Really Want?* Ottawa: Agriculture and Agri-Food Canada. Retrieved October 4, 2011, from http://www.aic.ca/conferences/pdf/curtis_johnson.pdf

Kendrick, J. (2009, April 9). *Statistics Canada: Organic: from niche to mainstream*. Retrieved September 15, 2012, from Statistics Canada: http://www.statcan.gc.ca/pub/96-325-x/2007000/article/10529-eng.htm

Kjaer, T. (2005). A review of discrete choice experiment- with emphasis on its application in health care. Odense: University Of Southern Denmark.

Kuhfeld, W. F. (2002). Multinomial Logit, Discrete Choice Modeling. An Introduction to Designing Choice Experiments, and Collecting, Processing, and Analyzing Choice Data with SAS. SAS Institute TS-677E.

Kuperis, P., Veeman, M. M., & Adamowicz, W. L. (1999). Consumer's Responses to the Potential Use of Bovine Somatotrophin in Canadian Dairy Production. *Canadian Journal of Agricultural Economics, 47*(2), 151-163.

Lancaster, K. J. (1966). A New Approach to Consumer Theory. *The Journal of Political Economy, 74*(2), 132-157.

Lantz, G., & Loeb, S. (1996). Country of Origin and Ethnocentrism: an Analysis of Canadian and American Preferences Using Social Identity Theory. *Advances in Consumer Research, 26*, 374-378. Retrieved September 29, 2012, from http://www.acrwebsite.org/search/view-conference-proceedings.aspx?Id=7985

Latvala, T. (2010). Risk, Information, and Trust in the Food Chain: Factors Explaining Consumer Willingness to Pay. *System Dynamics and Innovation in Food Networks* , (pp. 691-705).

Leitch, S., & Davenport, S. (2007). Corporate Brands and Social Brands: Co-branding GM-free and UK Supermarkets. *International Studies in Management and Organisation, 37*(4), 45-63.

Lobb, A. E. (2006). The country of origin of food : consumer perceptions of safety & the issue of trust. *99th EAAE Seminar 'Trust and Risk in Business Networks'*, (pp. 653-661). Bonn.

Los Angeles Times. (1996, November 9). *articles.latimes.com*. Retrieved March 15, 2012, from Los Angeles Times: http://articles.latimes.com/1996-11-09/business/fi-62903_1_apple-juice

Loureiro, M. L., & Umberger, W. J. (2005). Assessing Consumer Preferences for Country-of Origin-Labeling. *The Journal of Agricultural and Applied Economics, 37*(1), 49-63.

Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). *Stated Choice Methods.* Cambridge: Cambridge University Press.

Louviere, J., Street, D., Burgess, L., Wasi, N., Islam, T., & Marley, A. A. (2008). Modeling the choices of individual decison-makers by combining efficient choice experiment design with extra preference information. *Journal of Choice Modelling, 1*(1), 128-163.

Lusk, J. L. (2003). Effects of Cheap Talk on Consumer willingness to pay for Golden Rice. *American Journal of Agricultural Economics, 85*(4), 840-856.

Lusk, J. L., Roosen, J., & Fox, J. (2003). Demand for Beef from Cattle Administered with Growth Hormones or Fed Genetically Modified Corn: A Comparison of Consumers in France, Germany, the United Kingdom and the United States. *American Journal of Agricultural Economics, 85*(1), 16-29.

Mahajan, V., & Wind, Y. (2002). Got emotional product positioning? There's more to positioning than just features and benefits. *Marketing Management, 11*(3), 36-41.

Manski, C. F. (2000, March). Economic Analysis of Social Interactions. *Journal of Economic Perspectives, 14*(3), 115-136. Retrieved from http://www.nber.org/papers/w7580

Marlerclark.com. (1999). *Sun Orchard Salmonella Outbreak: marlerclark.com*. Retrieved August 11, 2011, from Marlerclark.com: http://www.marlerclark.com/case_news/view/sun-orchard-salmonella-outbreak-multistate

Morikawa, T., Ben-Akiva, M., & McFadden, D. (2002). Discrete choice models incorporating revealed preferences and psychometric data. *Advances in Econometrics, 16*, 29-55.

Nunes, P. F., Dull, S. F., & Lynch, P. D. (2003). *When Two Brands Are Better Than One*. Retrieved July 24, 2011, from http://www.accenture.com/SiteCollectionDocuments/PDF/outlook_crm.pdf

Peng, Y., West, G. E., & Wang, C. (2006). Consumer Attitudes and Acceptance of CLA-Enriched Dairy Products. *Canadian Journal of Agricultural Economics, 54*(4), 663-684.

Phau, I., & Prendergast, G. (2000). Conceptualizing the country of origin of brand. *Journal of Marketing Communications, 6*(3), 159-170.

Public Health Agency of Canada. (2012, July 30). *Lessons Learned: Public Health Agency of Canada's Response to the 2008 Listeriosis Outbreak*. Retrieved August 15, 2012, from Public Health Agency of Canada: http://www.phac-aspc.gc.ca/fs-sa/listeria/2008-lessons-lecons-eng.php

Quagrainie, K. K., Unterschultz, J., & Veeman, M. (1998). Effects of Product Origin and Selected Demographics on Consumer Choice of Red Meats. *Canadian Journal of Agricultural Economics, 46*(2), 201-219.

Shimp, T. A., & Sharma, S. (1987). Consumer Ethnocentrism : Construction and Validation of the CETSCALE. *Journal of Marketing and Research, 24*(3), 280-289.

Shin, S.-Y., Kliebenstein, J., Hayes, D., & Shogren, J. (1992). Consumer Willingness to pay for Safer Food Products. *Journal of Food Safety, 13*(1), 51-59.

So, Y., & Kuhfeld, W. (1995). Multinomial Logit models. *SUGI 20 Conference Proceedings.* SAS Institute Inc.

Statistics Canada. (2006). Census of Population, Statistics Canada catalogue no. 97-563-XCB2006005. Canada. Retrieved September 15, 2012, from http://www12.statcan.ca/census-recensement/2006/dp-pd/tbt/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK

=0&GRP=1&PID=94188&PRID=0&PTYPE=88971,97154&S=0&SHOWALL=0&SUB=0&Temporal=2006&THEME=75&VID=0&VNAMEE=&VNAMEF=

Statistics Canada. (2011, April 7). *Census of Population, Statistics Canada catalogue no. 97-560-XCB2006008 (Canada, Code01)*. Retrieved January 9, 2012, from Statistics Canada: http://www12.statcan.ca/census-recensement/2006/dp-pd/tbt/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=93610&PRID=0&PTYPE=88971,97154&S=0&SHOWALL=0&SUB=0&Temporal=2006&THEME=75&VID=0&VNAMEE=&VNAMEF=

Statistics Canada. (2012, September 27). Table 051-0001. Estimates of population, by age group and sex for July 1, Canada, provinces and territories. Retrieved March 15, 2013, from http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0510001&pattern=&csid=

Stearns, J. M., Borna, S., & Oakenfull, G. (2003). Buying for Love of Country: Assessing the Ethics of Patriotic Appeals in Advertising. *Business and Society Review, 108*(4), 509-521.

The AgriPost. (2009, February 28). *Manitoba Agriculture News*. Retrieved October 8, 2011, from Mysteinbach.ca: http://www.mysteinbach.ca/newsblog/1244.html

The New York Times. (1985, April 17). *Salmonella Outbreak is Traced*. Retrieved August 20, 2011, from The New York Times: http://www.nytimes.com/1985/04/17/garden/salmonella-outbreak-is-traced.html

Tino, B.-L., & Klaus, G. G. (2003). The perceived healthiness of functional foods A conjoint study of Danish, Finnish and American consumers' perceptions of functional foods. *Appetite, 40*(1), 9-14.

Train, K. (2009). *Discrete Choice Methods.* New York: Cambridge University Press.

Unterschultz, J., Quagrainie, K. K., Veeman, M., & Kim, R. B. (1998). South Korean Hotel Meat Buyers' Perceptions of Australian, Canadian and U.S. Beef. *Canadian Journal of Agricultural Economics, 46*(1), 53-68.

Vassella, M. C., Fountain, P. D., & Fountain, U. K. (2010). Consumer Ethnocentrism, Patriotism, Global Openness and Country of Origin Effect: A Literature Review. *ASBBS Annual Conference.* Las Vegas.

Volinskiy, D., Adamowicz, W. L., Veeman, M. M., & Srivastava, L. (2007). Are Country of Origin and non-GM Premia Invariant to Experimental Auction Structure? *Annual Conference, Australian Agricultural and Resource Economics Society.* Queenstown: Department of Rural

Economy, University of Alberta, Edmonton, Alberta. Retrieved from http://ageconsearch.umn.edu/handle/10378

Wang, Q., Halbrendt, C., Kolodinsky, J., & Schmidt, F. (1997). Willingness to pay for rBST-free milk: a two-limit Tobit model analysis. *Applied Economic Letters*, *4*(10), 619-621.

Weber, E. U., & Milliman, R. A. (1997). Perceived Risk Attitudes: Relating Risk Perception to Risky Choice. *Management Science, 43*(2), 123-144.

Wessells, C. R., & Anderson, J. G. (1995). Consumer Willingness to Pay for Seafood Safety Assurances. *The Journal of Consumer Affairs, 29*(1), 85-107.

Westgren, R. E. (1999). Delivering Food safety, Food Quality, and Sustainable Production Practices: The Label Rouge poultry System in France. *American Journal of Agricultural Economics, 81*(5), 1107-1111.

Williams, B., Onsman, A., & Brown, T. (2010). Exploratory factor analysis: A five-step guide for novices. *Journal of Emergency Primary Health Care, 8*(3), 1-13. Retrieved May 09, 2012, from http://www.jephc.com/uploads/9900399BW.pdf

Yeo Hiap Seng. (2008). *The Natural Choice for Malaysians and Around the World.* Retrieved March 9, 2013, from http://announcements.bursamalaysia.com/EDMS/subweb.nsf/7f04516f8098680348256c6f0017a6bf/24cb62714fabd1bd4825758a002393f1/$FILE/YHS-Cover%20to%20Page%2016%20(2.1MB).pdf

Zeithaml, V. A. (1988). Consumer perceptions of price, quality and value: A means-end model and Synthesis of Evidence. *Journal of Marketing, 52*(3), 2-22.

Appendixes

Appendix A: Examples of Products with the 100% Canadian Milk Symbol

Source: Compiled by author from photos taken of actual retail products

Appendix B: Changes in the Symbol used to Represent Canadian Milk on Dairy products.

Source: www.Dairygoodness.ca

Appendix C: The Distribution of Dairy Farms by Province

Province	Number of Dairy Farms	Percentage of Total
Alberta	585	4.67
British Columbia	491	3.92
Manitoba	332	2.65
New Brunswick	214	1.71
Newfoundland	33	0.26
Nova Scotia	237	1.89
Ontario	4083	32.59
Prince Edward Island	193	1.54
Quebec	6189	49.40
Saskatchewan	172	1.37
Total	12529	100.00

Source: CDIC, 2012c

Appendix D: Factor Analysis Justification- Milk Survey

Appendix D and Appendix E present the results for the reliability of the three extracted factors from the milk and ice cream data respectively. Cronbach's Alpha was used to ascertain the reliability of the health factor, patriotic values factor and the risk factor. Cronbach's Alpha measures factor reliability with a maximum value of 1, with higher values indicating greater reliability. This measure of reliability indicates that the factor extracted is stable and that even if questions were replaced with other similar questions consistent and reliable responses would be elicited. As can be noted the reliability of all three factors is sufficient, although the reliability of factor 3 is on the low side.

Factor 1- Health Consciousness

Reliability Statistics

Cronbach's Alpha	N of Items
.859	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
How often do you eat the following foods from a fast food restaurant?				
Burger	20.72	8.576	0.677	0.83
Pizza	20.7	9.149	0.66	0.836
Fries	20.75	8.492	0.723	0.822
Hot dogs	20.28	8.649	0.666	0.832
Pastry	20.64	8.178	0.583	0.855
Fried Chicken	20.39	8.97	0.635	0.838

The Item-Total Statistics table reflects how each variable contributes to the overall reliability of the factor, as seen in the last column. The corrected to total item-correlation reflects how each item correlates with the other items in the factor. In the last column, Cronbach's alpha, if deleted, reflects what would be the resultant alpha if an item is deleted. The values in that column should be about the same as the overall alpha. If the inclusion of a factor results in a substantial increase

in “Cronbach’s alpha if deleted” then perhaps that item should be deleted from the factor to increase the factor’s reliability.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.588	59.795	59.795	3.588	59.795	59.795
2	.711	11.845	71.640			
3	.535	8.913	80.553			
4	.464	7.741	88.294			
5	.432	7.203	95.497			
6	.270	4.503	100.000			

Extraction Method: Principal Component Analysis.

The total variance explained table shows that the extracted factor represents only one factor and the total variance explained by that factor. For all four factors the total variance explained by the factor is greater than 50%.

Factor 2-Values

Reliability Statistics

Cronbach's Alpha	N of Items
.784	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
How much do you agree with the following statements				
I feel a sense of joy and pride whenever I see the maple leaf symbol known to be associated with Canada	8.38	7.809	0.639	0.718
I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range	8.32	7.68	0.616	0.725
I consider myself to be patriotic	8.29	7.702	0.651	0.713
I think that buying a local product instead of a foreign product helps to support the local economy.	8.75	8.841	0.589	0.742
It is not right to purchase foreign products, because it puts Canadians out of jobs	7.5	8.651	0.364	0.815

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.483	49.665	49.665	2.483	49.665	49.665
2	1.043	20.862	70.526			
3	.670	13.405	83.932			
4	.506	10.130	94.061			
5	.297	5.939	100.000			

Extraction Method: Principal Component Analysis.

Factor 3- Risk Preference

Reliability Statistics

Cronbach's Alpha	N of Items
.531	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
How much do you agree with the following statements				
I am usually interested in trying out foreign products	5.36	2.111	0.323	0.463
A little risk is good	5.9	2.208	0.367	0.403
I would consider myself to be more risky than the average person	5.36	1.813	0.35	0.426

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.556	51.859	51.859	1.556	51.859	51.859
2	.754	25.122	76.981			
3	.691	23.019	100.000			

Extraction Method: Principal Component Analysis.

Appendix E- Factor Analysis Justification- Ice cream

Factor 1- Health Consciousness

Reliability Statistics

Cronbach's Alpha	N of Items
.852	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
How often do you eat the following foods from a fast food restaurant				
Burger	25	11.843	0.699	0.82
Pizza	25.02	12.203	0.684	0.823
Fries	25.06	11.762	0.737	0.815
Hot dogs	24.57	11.786	0.671	0.823
Pastry	24.89	11.626	0.571	0.84
Fried Chicken	24.68	12.148	0.664	0.825
How much do you agree with the following statement: Doctors are in charge of my health; therefore, I am not concerned about it	24.83	12.817	0.365	0.872

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.900	55.721	55.721	3.900	55.721	55.721
2	.834	11.912	67.633			
3	.665	9.494	77.127			
4	.496	7.089	84.216			
5	.450	6.432	90.648			
6	.372	5.319	95.966			
7	.282	4.034	100.000			

Extraction Method: Principal Component Analysis.

Factor 2- Values

Reliability Statistics

Cronbach's Alpha	N of Items
.784	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
How much do you agree with the following statements				
I am usually not concerned about the origin of foods that I purchase***	10.1126	10.773	0.456	0.775
I consider myself to be patriotic	10.8918	10.641	0.651	0.725
I think that buying a local product instead of a foreign product helps to support the local economy.	11.2583	11.546	0.595	0.743
I feel a sense of joy and pride whenever I see the maple leaf symbol known to be associated with Canada.	10.9316	10.829	0.6	0.736
I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range.	10.8366	10.664	0.571	0.742
It is not right to purchase foreign products, because it puts Canadians out of jobs.	9.9868	11.354	0.395	0.789

***The scale of this item was reversed

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.636	43.926	43.926	2.636	43.926	43.926
2	1.000	16.674	60.599			
3	.809	13.489	74.089			
4	.654	10.892	84.981			
5	.566	9.431	94.411			
6	.335	5.589	100.000			

Extraction Method: Principal Component Analysis.

Factor 3- Risk Preference

Reliability Statistics

Cronbach's Alpha	N of Items
.583	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
How much do you agree with the following statements				
A little risk is good	13.0132	5.473	0.439	0.478
I only purchase brands that have been tried and proven***	11.8874	6.574	0.229	0.579
I don't believe in making risky investments***	12.1015	5.18	0.331	0.538
I am usually interested in trying out foreign products.	12.468	5.67	0.34	0.528
I would consider myself to be more of a risk taker than the average person	12.3753	5.049	0.378	0.506

***The scale of this item was reversed

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.899	37.980	37.980	1.899	37.980	37.980
2	.986	19.712	57.692			
3	.788	15.758	73.450			
4	.746	14.920	88.370			
5	.582	11.630	100.000			

Extraction Method: Principal Component Analysis.

Appendix F: The Survey

Please note that in completing the following survey questions your answers will remain anonymous

Purchasing Habits

Instructions: Please indicate your preference by selecting the appropriate checkbox.

1) Do you consume dairy products? :

Yes ☐

No ☐

2) On a scale of 1 to 5, on average, how often do you purchase ***Fluid milk*** per month:

Never	Once	Twice	3 to 4 times	More than 4 times
1	2	3	4	5
☐	☐	☐	☐	☐

3) On a scale of 1 to 5, on average, approximately what container size of **milk** do you purchase most frequently :

0.25 L	0.5 L	1L	2L	4L
1	2	3	4	5
☐	☐	☐	☐	☐

If respondent purchases the 2L most frequently ask this question (3b)

3b) On average, how much do pay for 2Litres of Milk? (enter price in number)_____

4) On average how many packages of **Milk** do you purchase **per month? (Please enter the number)** :_____

Awareness and brand preference

1) Are you aware of the **100% Canadian Milk brand?;**

It is represented by this label: 

Yes I am aware ☐

No I am not aware ☐

In some of the questions below you will encounter the terms **"Store brand"** and **"National brand**". **"Store brand"** refers to brands that are only available at a given set of stores (e.g. Safeway brand products (available at Safeway supermarkets and affiliated stores), President's choice products which are available at these Superstore supermarkets

"National brand refers to brands that can be found nationwide at any store (e.g. Breyers, Chapmans, Nestle etc.)

2) On a scale of 1 to 5, in a typical month how often do you purchase ***MILK*** **with the following labels**

		Never 1	Once 2	Twice 3	3 to 4 times 4	More than 4 times 5
A	100% Canadian Milk	☐	☐	☐	☐	☐
B	Both 100% Canadian Milk and Organic	☐	☐	☐	☐	☐
C	A Store Brand	☐	☐	☐	☐	☐
D	A National Brand	☐	☐	☐	☐	☐
E	Both 100% Canadian milk and Store Brand	☐	☐	☐	☐	☐
F	Both 100% Canadian milk and National Brand	☐	☐	☐	☐	☐
G	Both Organic and Store Brand	☐	☐	☐	☐	☐
H	Both Organic and National Brand	☐	☐	☐	☐	☐

Consumers' preferences for attributes of Milk

1) Please tick the attributes that are important to you when purchasing **milk**

a.	i. Price	☐
	ii. Fat content	☐
	iii. Brand	☐
	iv. Country of origin	☐
	v. Appearance/packaging	☐
	vi. Nutritional Content	☐
	vii. Taste	☐
	viii. Best Before date	☐
b.	From the factors above please specify the one that you would consider to be most important: _____	
c.	From those factors above, which would you consider to be the least important; please state: _____	
d.	If there are other factors that you consider to be **very important** that aren't listed please list them:_____ _____ _____	

Consumers' perceptions toward the 100% Canadian milk brand

1) On a scale of 1 to 5 please rate your agreement with the following statements "***If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be…***"

		Strongly Agree 1	Agree 2	Neutral 3	Disagree 4	Strongly Disagree 5
a	A quality product	☐	☐	☐	☐	☐
b	A local product	☐	☐	☐	☐	☐
c	A nutritious	☐	☐	☐	☐	☐
d	An inferior product	☐	☐	☐	☐	☐
e	An expensive product	☐	☐	☐	☐	☐
f	A healthy Product	☐	☐	☐	☐	☐

2) On a scale of 1 to 5, please rate your agreement with the following statements "In comparison to milk products **without** the 100% Canadian milk logo, I consider ***milk with the 100% Canadian milk logo to be****:*

		Yes I Strongly Agree 1	Yes I Agree 2	I think it is the same 3	I think it is slightly unsafe 4	No I believe that it is very unsafe to consume 5
a	Safer to consume	☐	☐	☐	☐	☐

		Yes, I really think so 1	Yes, to some extent 2	The quality is about the same 3	I think the quality is slightly poorer 4	I think the quality is a lot poorer 5
b	Of higher quality	☐	☐	☐	☐	☐

		Yes, to a great extent 1	Yes, somewhat 2	I think it is the same 3	I think it is less nutritious 4	I think the nutritional content is very poor 5
c	More nutritious	☐	☐	☐	☐	☐

		I strongly agree 1	I somewhat agree 2	I think it offers the same 3	I think it offers slightly less 4	I think it offers a lot less 5
d	Better value for money	☐	☐	☐	☐	☐

Attitudes toward Risk

Please indicate your agreement with the following questions by checking the appropriate box

1) I would consider myself to be more risky than the average person:

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5
☐	☐	☐	☐	☐

2) I only purchase brands that have been tried and proven

All the time	Most of the Time	Sometimes	Almost never	Never
1	2	3	4	5
☐	☐	☐	☐	☐

3) When purchasing a product that I use a lot, I tend to purchase the same brand each time:

All the time	Most of the Time	Sometimes	Almost never	Never
1	2	3	4	5
☐	☐	☐	☐	☐

4) New products are more risky than products which have been in the market for a while

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5
☐	☐	☐	☐	☐

5) I don't believe in making risky investments

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5
☐	☐	☐	☐	☐

6) A little risk is good

Always	Most of the time	Sometimes	Almost never	Never
1	2	3	4	5
☐	☐	☐	☐	☐

Patriotism/Ethnocentrism

1) I think that buying a local product instead of a foreign product helps to support the local economy.

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5
☐	☐	☐	☐	☐

2) How much do you agree with the following statement: "I consider myself to be patriotic"

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5
☐	☐	☐	☐	☐

3) How much do you agree with the following statement: "I feel a sense of joy and pride whenever I see the maple leaf symbol known to be associated with Canada"

Always	Most of the time	Sometimes	Almost never	Never
1	2	3	4	5
☐	☐	☐	☐	☐

4) I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5
☐	☐	☐	☐	☐

5) I am usually interested in trying out foreign products

Always	Most of the time	Sometimes	Almost Never	Never
1	2	3	4	5
☐	☐	☐	☐	☐

6) We should buy from foreign countries only those products that we cannot obtain within our own country.

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5
☐	☐	☐	☐	☐

7) It is not right to purchase foreign products, because it puts Canadians out of jobs

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5
☐	☐	☐	☐	☐

8) I am usually **not** concerned about the origin of foods that I purchase

Strongly Agree 1	Agree 2	Neutral 3	Disagree 4	Strongly disagree 5
☐	☐	☐	☐	☐

9) Have you ever lived or worked on a farm?

Yes ☐

No ☐

10) On average how often do you shop at a farmers' market per month?

Never 1	Once 2	Twice 3	3 to 4 times 4	More than 4 times 5
☐	☐	☐	☐	☐

11) Imagine that you are at the supermarket shopping for milk; you see a milk brand with which you are unfamiliar. *The milk however displays the 100% Canadian milk logo*. On a scale of 1 to 5 please rate your agreement with the following statements:

		Strongly Agree 1	Agree 2	Neutral 3	Disagree 4	Strongly Disagree 5
a	I would never purchase that milk	☐	☐	☐	☐	☐
b	I would be reluctant to buy it but would consider it	☐	☐	☐	☐	☐
c	I would purchase it if it is cheaper	☐	☐	☐	☐	☐
d	I would purchase it if the price is in the normal range	☐	☐	☐	☐	☐
e	I would purchase it regardless of the cost	☐	☐	☐	☐	☐

Consumer Health Profile

Please indicate your answers to the following questions by selecting the most suitable response

1) On average, how often do you exercise?

Everyday 1	Every other day 2	Three times per week 3	When it is convenient 4	I never get the time 5
☐	☐	☐	☐	☐

2) On average, how often do you take health supplements?

Everyday 1	Every other day 2	Once per Week 3	1 to 2 times per month 4	Never 5
☐	☐	☐	☐	☐

3) How often do you eat the following foods from a fast food restaurant?

	Everyday 1	Every other day 2	Once per week 3	1 to 2 times per month 4	Never 5
Burger	☐	☐	☐	☐	☐
Pizza	☐	☐	☐	☐	☐
Fries	☐	☐	☐	☐	☐
Hot dogs	☐	☐	☐	☐	☐
Pastry	☐	☐	☐	☐	☐
Fried Chicken	☐	☐	☐	☐	☐

4) How often do you purchase food labelled as Natural or Organic?

Always 1	Most of the time 2	Occasionally 3	Almost Never 4	Never 5
☐	☐	☐	☐	☐

5) Life is too short to spend worrying about my health so I just enjoy life and all food in general

Strongly Agree 1	Agree 2	Neutral 3	Disagree 4	Strongly disagree 5
☐	☐	☐	☐	☐

6) Doctors are in charge of my health; therefore, I am not concerned about it.

Strongly Agree 1	Agree 2	Neutral 3	Disagree 4	Strongly disagree 5
☐	☐	☐	☐	☐

Before you complete the next section, I want to talk to you about a problem that happens in studies like this one.

The questions presented in this section are hypothetical ones, although they try to mimic the choices available for purchase on a regular shopping trip. The product in question may have other attributes that are not included and the available prices may be different from the ones you now see at the supermarket you shop at. However, we want you to imagine that the prices and attributes available below are the ones that you see on a shopping trip, and make your choice based on what you actually believe you would choose. Because you may see different attributes features when you go shopping for this product, the situation creates what is called a "hypothetical bias". This generally occurs when people respond to questions differently in a hypothetical situation, such as this, versus a real situation involving real products and real money. So it is important that you answer the questions exactly as you would answer if you were really going to face these choices at your grocery store and buy the item with real money.

Section B- Consumers' willingness to pay for co-branded dairy products

Imagine that you are in grocery store shopping, you suddenly remember that you are almost out of milk and decide to shop for a *2-litre carton of milk*. There are different milks available with varying attributes and at different prices. You can either choose to purchase one if it suits you or decide against purchasing the available options.

In the table below you will find a list of features that will be seen in the next eight questions. The explanation of each attribute is also provided and is expected to help you to better understand the questions being asked.

Attributes	Explanation
	The symbol is a seal of origin that guarantees the dairy products you're buying are made entirely from 100% Canadian milk or milk ingredients.
Type: Organic, Conventional	Milk labelled organic suggests that cows used to produce this milk have not been treated with hormones and that the milk contains no antibiotic. No such claims/suggestions are made with regards to conventional milk
Brand: National, Store	A National brand such as Chapman's and Breyers can be found throughout the country in all stores while store brands are only found in the affiliated store. For example, Safe Way brands (only found in Safe Way and affiliated stores) and President Choice brands only found in Canadian Super Store and affiliated stores.
Price: Range $2.83 to $5.52	National average price range for a 2-litre carton of milk (conventional and organic)

Please preview the example below in order to better understand the upcoming section.

Example: Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	**Option B**	**Option C**	**I would not purchase any**
Labelled : 				
Type	ORGANIC	CONVENTIONAL	CONVENTIONAL	
Brand	STORE	NATIONAL	NATIONAL	
Price ($)	4.60	5.52	2.83	
I would choose...	☐	☑	☐	☐

I have selected option B. By selecting option B, I have indicated that of the four choices available, I would purchase a 2-litre carton of milk with the 100% Canadian milk label,

which is regular, that is a national brand (any national brand) and that I would be willing to pay $5.52 for this product

Instructions: For the next eight questions please indicate what option you would choose by selecting the appropriate checkbox.

1) Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	Option B	Option C	I would not purchase any
Labelled :				
Type	CONVENTIONAL	ORGANIC	CONVENTIONAL	
Brand	STORE	STORE	NATIONAL	
Price ($)	4.60	3.40	3.40	
I would choose...	☐	☐	☐	☐

2) Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	Option B	Option C	I would not purchase any
Labelled:				
Type	CONVENTIONAL	ORGANIC	ORGANIC	
Brand	STORE	NATIONAL	STORE	
Price ($)	3.40	3.40	2.83	
I would choose...	☐	☐	☐	☐

3) Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	Option B	Option C	I would not purchase any
Labelled:				
Type	ORGANIC	CONVENTIONAL	ORGANIC	
Brand	NATIONAL	NATIONAL	STORE	
Price ($)	5.52	4.60	5.52	
I would choose...	☐	☐	☐	☐

4) Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	Option B	Option C	I would not purchase any
Labelled				
Type	ORGANIC	CONVENTIONAL	ORGANIC	
Brand	STORE	STORE	NATIONAL	
Price ($)	4.60	3.40	4.60	
I would choose...	☐	☐	☐	☐

5) Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	Option B	Option C	I would not purchase any
Labelled				
Type	ORGANIC	ORGANIC	CONVENTIONAL	
Brand	STORE	STORE	STORE	
Price ($)	4.60	5.52	2.83	
I would choose...	☐	☐	☐	☐

6) Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	Option B	Option C	I would not purchase any
Labelled				
Type	CONVENTIONAL	ORGANIC	CONVENTIONAL	
Brand	NATIONAL	NATIONAL	NATIONAL	
Price ($)	5.52	2.83	3.40	
I would choose...	☐	☐	☐	☐

7) Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	Option B	Option C	I would not purchase any
Labelled				
Type	CONVENTIONAL	CONVENTIONAL	CONVENTIONAL	
Brand	STORE	NATIONAL	NATIONAL	
Price ($)	3.40	5.52	4.60	
I would choose...	☐	☐	☐	☐

8) Imagine that you are shopping for milk the alternatives below are the only ones available for purchase, select the one that you would choose:

	Option A	Option B	Option C	I would not purchase any
Labelled:				
Type	CONVENTIONAL	ORGANIC	ORGANIC	
Brand	NATIONAL	STORE	STORE	
Price ($)	2.83	2.83	2.83	
I would choose...	☐	☐	☐	☐

Industry Knowledge

1) With the exception for chocolate milk, all milk sold in Canada must be produced in Canada, so even if it does not display the 100% Canadian milk symbol, it is Canadian?

a) True ☐

b) False ☐

If respondent chooses b) move to next question

2) If the previous statement were true, would this affect any of your choices in the previous section?

a) Yes ☐

b) No ☐

3) Approximately 81% of Canadian dairy farms are located in Ontario and Quebec

a) True ☐

b) False ☐

4) Milk is **NOT** a good source of Calcium

a) True ☐

b) False ☐

Section C- Demographic Information

The following questions are designed to help us get a better understanding of your background and the factors that may influence your purchasing decisions relative to other respondents. Your identity will not be linked to your responses.

Instructions: Please tick the appropriate box or write on the line provided.

1. What is your gender
   - Male ☐
   - Female ☐

2. What range best describes your household size including yourself?
   a) 1 ☐
   b) 2-4 ☐
   c) 5-7 ☐
   d) Over 7 ☐

3. Do you or any member of your household suffer from any dietary related health issues such as high blood pressure, high cholesterol and heart disease:
   - Yes ☐
   - No ☐

4. Are you or any member of your household allergic to dairy products?
   - Yes ☐
   - No ☐

5. How many children under age 12 currently reside in your household? _____

6. Which of the following group best describes your household's gross annual income?
   a) Less than $25 000 ☐
   b) 25 000- 44 999 ☐
   c) 45 000-64 999 ☐
   d) 65 000- 84 999 ☐
   e) 85 000-104 999 ☐
   f) 105 000-150 000 ☐
   g) Over 150 000 ☐

7. Which of the following categories best describe your role in the grocery shopping for your household?

    a) Primary Shopper ☐
    b) Someone else is the primary shopper ☐
    c) The shopping is shared ☐

8. What is the highest level of education that you have completed? :
    a) Less than high school ☐
    b) High School ☐
    c) Some College ☐
    d) Bachelor's Degree ☐
    e) Graduate Degree ☐

9. Please indicate which category best describes your age.
    a) Under 20 ☐
    b) 20-30 ☐
    c) 31-40 ☐
    d) 41-50 ☐
    e) 51-65 ☐
    f) 66 and over ☐

10. Please enter the first three digits of your postal code:_____

Thank you very much for participating in this survey!

By completing this survey you have played an integral role towards the completion of my Master's thesis, which seeks to assess consumers' willingness to pay for dairy products co-branded with the 100% Canadian milk label.

If you have any comments or concerns, pertaining to the survey please feel free to write it in the box provided below.

Appendix G: Frequency Distributions

Frequency Distribution reflecting Milk respondents' perceptions of products with the 100% Canadian milk symbol

A local product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	143	31.4	31.4	31.4
Agree	157	34.5	34.5	65.9
Neutral	119	26.2	26.2	92.1
Disagree	28	6.2	6.2	98.2
Strongly Disagree	8	1.8	1.8	100.0
Total	455	100.0	100.0	

Most of the respondents agreed that the symbol helped to identify products as local and that they would therefore view a product with the 100% Canadian milk symbol as a local product. On the other hand 26% of respondents neither agreed nor disagreed which shows some uncertainty about what the symbol represents. 8% of respondents blatantly disagreed.

A nutritious product (D1)

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	186	40.9	40.9	40.9
Agree	186	40.9	40.9	81.8
Neutral	71	15.6	15.6	97.4
Disagree	5	1.1	1.1	98.5
Strongly Disagree	7	1.5	1.5	100.0
Total	455	100.0	100.0	

Most respondents agreed that the 100% Canadian milk symbol on a product signals that the product is a nutritious product, while approximately 3% of respondents disagreed. Clearly, health conscious respondents would therefore be expected to be willing to pay a premium to have this symbol on their dairy products if this represents their view.

An inferior product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	31	6.8	6.8	6.8
Agree	38	8.4	8.4	15.2
Neutral	60	13.2	13.2	28.4
Disagree	134	29.5	29.5	57.8
Strongly Disagree	192	42.2	42.2	100.0
Total	455	100.0	100.0	

While a few respondents believe that products with the symbol identified that product as an inferior product most respondents, over (70%), unambiguously disagreed with this statement. While 13% neither agreed nor disagreed.

An expensive product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	32	7.0	7.0	7.0
Agree	64	14.1	14.1	21.1
Neutral	210	46.2	46.2	67.3
Disagree	94	20.7	20.7	87.9
Strongly Disagree	55	12.1	12.1	100.0
Total	455	100.0	100.0	

Most respondents clearly do not think that the symbol being present on a product means that the product is expensive. On the other hand 21% of respondents believe that the symbol identified that product as being expensive.

A healthy product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	175	38.5	38.5	38.5
Agree	189	41.5	41.5	80.0
Neutral	74	16.3	16.3	96.3
Disagree	9	2.0	2.0	98.2
Strongly Disagree	8	1.8	1.8	100.0
Total	455	100.0	100.0	

Most respondents view the symbol as a representation of healthy product, as 80% of respondents indicated that they view products with the symbol as an indication of a healthy product. A relatively small number of respondents disagreed.

Safer to consume

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes, I Strongly Agree	188	41.3	41.3	41.3
Yes, I Agree	151	33.2	33.2	74.5
I think it is about the same	107	23.5	23.5	98.0
No, I think it is slightly unsafe	7	1.5	1.5	99.6
No, I believe that it is very unsafe to consume	2	.4	.4	100.0
Total	455	100.0	100.0	

Although most respondents saw the symbol as an indication of a healthy product, the number of respondents indicating that the symbol identified that product as safer to consume is clearly significantly less. This indicates that respondents do not believe that healthy means safe.

Of higher quality

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes, I really think so	170	37.4	37.4	37.4
Yes, to some extent	164	36.0	36.0	73.4
The quality is about the same	111	24.4	24.4	97.8
No, I think the quality is slightly poorer	6	1.3	1.3	99.1
No, I think the quality is a lot poorer	4	.9	.9	100.0
Total	455	100.0	100.0	

Most respondents indicated that they believe products with the symbol are of higher quality than products without the symbol. On the other hand quite a number of respondents neither agreed nor disagreed.

More nutritious

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes, to a great extent	106	23.3	23.3	23.3
Yes, somewhat	135	29.7	29.7	53.0
I think it is about the same	208	45.7	45.7	98.7
No, I think it is less nutritious	6	1.3	1.3	100.0
Total	455	100.0	100.0	

Most respondents indicated that they believe that products with the symbol and products without the symbol have the same level of nutrition. On the other hand 53% indicated that products with symbol are more nutritious. Clearly there is some heterogeneity among respondents in their beliefs

Better value for money

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes, I strongly agree	110	24.2	24.2	24.2
Yes, I somewhat agree	133	29.2	29.2	53.4
I think it offers about the same	182	40.0	40.0	93.4
No, I think it offers slightly less	26	5.7	5.7	99.1
No, I think it offers a lot less	4	.9	.9	100.0
Total	455	100.0	100.0	

As it relates to whether or not respondents view the symbol to be an indication of better value for money most respondents were indifferent as they indicated that the quality was about the same as products without the symbol.

Frequency Distribution reflecting Ice cream respondents' perceptions of products with the 100% Canadian milk symbol

A quality product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	210	46.4	46.4	46.4
Agree	190	41.9	41.9	88.3
Neutral	44	9.7	9.7	98.0
Disagree	2	.4	.4	98.5
Strongly Disagree	7	1.5	1.5	100.0
Total	453	100.0	100.0	

Most of the ice cream respondents (88%) indicated that products with the symbol were of higher quality than products without the symbol. While a relatively small number of respondents were either indifferent or indicated that products with the symbol is an indication of quality.

A local product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	129	28.5	28.5	28.5
Agree	168	37.1	37.1	65.6
Neutral	119	26.3	26.3	91.8
Disagree	29	6.4	6.4	98.2
Strongly Disagree	8	1.8	1.8	100.0
Total	453	100.0	100.0	

Most respondents agreed that products with the symbol indicate a local product. At the same time over 25% of respondents neither agreed nor disagreed.

A nutritious product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	121	26.7	26.7	26.7
Agree	185	40.8	40.8	67.5
Neutral	128	28.3	28.3	95.8
Disagree	12	2.6	2.6	98.5
Strongly Disagree	7	1.5	1.5	100.0
Total	453	100.0	100.0	

Most respondents agreed that products with the symbol are nutritious products while 28% of respondents were indifferent indicating some level of heterogeneity in responses.

An inferior product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	24	5.3	5.3	5.3
Agree	30	6.6	6.6	11.9
Neutral	80	17.7	17.7	29.6
Disagree	161	35.5	35.5	65.1
Strongly Disagree	158	34.9	34.9	100.0
Total	453	100.0	100.0	

Most respondents disagreed with the statement that the symbol indicates that a product is inferior.

An expensive product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	18	4.0	4.0	4.0
Agree	81	17.9	17.9	21.9
Neutral	229	50.6	50.6	72.4
Disagree	102	22.5	22.5	94.9
Strongly Disagree	23	5.1	5.1	100.0
Total	453	100.0	100.0	

Respondents were mostly uncertain as to whether or not the symbol means that a product is relatively expensive. 27% of respondents however disagreed that this was the case.

A healthy product

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	91	20.1	20.1	20.1
Agree	190	41.9	41.9	62.0
Neutral	150	33.1	33.1	95.1
Disagree	12	2.6	2.6	97.8
Strongly Disagree	10	2.2	2.2	100.0
Total	453	100.0	100.0	

While most respondents indicated that they view products with the symbol as healthy products. As much as one-third of respondents were indifferent.

Safer to consume

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes, I Strongly Agree	137	30.2	30.2	30.2
Yes, I Agree	187	41.3	41.3	71.5
I think it is about the same	124	27.4	27.4	98.9
No, I think it is slightly unsafe	3	.7	.7	99.6
No, I believe that it is very unsafe to consume	2	.4	.4	100.0
Total	453	100.0	100.0	

Over 70% of respondents indicated that they view products with the symbol to be safer to consume.

Of higher quality

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes, I really think so	144	31.8	31.8	31.8
Yes, to some extent	188	41.5	41.5	73.3
The quality is about the same	112	24.7	24.7	98.0
No, I think the quality is slightly poorer	7	1.5	1.5	99.6
No, I think the quality is a lot poorer	2	.4	.4	100.0
Total	453	100.0	100.0	

Most respondents indicated they view products with the symbol to be of higher quality as opposed to products without the symbol. Approximately 25% of respondents however also indicated their indifference.

More nutritious

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes, to a great extent	86	19.0	19.0	19.0
Yes, somewhat	171	37.7	37.7	56.7
I think it is about the same	190	41.9	41.9	98.7
No, I think it is less nutritious	6	1.3	1.3	100.0
Total	453	100.0	100.0	

Clearly, while respondents think that products with the symbol are safer to consume most respondents also view the qualities to be about the same.

Appendix H: Descriptive Statistics- Milk Survey

Purchasing Habits & Brand Awareness and Preferences

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
On average, how often do you purchase milk (i.e. milk as a liquid not powder form) per month (1=never, 5=more than 4 times)	455	2	5	4.16	0.874
Approximately what container size of milk do you purchase most frequently (1=Smallest, 5= Largest)	455	1	5	4.35	0.795
Are you aware of the 100% Canadian Milk brand? (1=Yes, 2=No)	455	1	2	1.06	0.241
In a typical month period how often do you purchase milk with the 100% Canadian Milk label(1=never, 5=More than 4 times)	455	1	5	3.19	1.499
In a typical month how often do you purchase MILK with both 100% Canadian Milk and Organic labels (1=never, 5=More than 4 times)	455	1	5	1.44	0.96
In a typical month period how often do you purchase milk with a Store Brand label (1=never, 5= more than 4 times)	455	1	5	1.69	1.21
In a typical month period how often do you purchase milk with a National Brand label (1=never, 5= more than 4 times)	455	1	5	2.95	1.502
In a typical month period how often do you purchase milk with both 100% Canadian milk and Store Brand labels (1=never, 5= more than 4 times)	455	1	5	1.77	1.285
In a typical month period how often do you purchase milk with both 100% Canadian milk and National Brand labels (1=never, 5=more than 4 times)	455	1	5	2.47	1.535
In a typical three month period how often do you purchase milk with both Organic and Store Brand labels (1=never, 5= more than 4 times)	455	1	5	1.24	0.71
In a typical month period how often do you purchase milk with both Organic and National Brand labels (1=never, 5= more than 4 times)	455	1	5	1.3	0.829

Consumers' Perceptions towards the 100% Canadian milk Brand

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **a quality product (**1= strongly agree, 5=strongly disagree**)**	455	1	5	1.56	0.791
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **a local product** (1= strongly agree, 5=strongly disagree)	455	1	5	2.12	0.983
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **a nutritious product** (1= strongly agree, 5=strongly disagree)	455	1	5	1.82	0.845
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **an inferior product** (1= strongly agree, 5=strongly disagree)	455	1	5	3.92	1.224
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **an expensive product** (1= strongly agree, 5=strongly disagree)	455	1	5	3.17	1.042
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **a healthy product** (1= strongly agree, 5=strongly disagree)	455	1	5	1.87	0.877
In comparison to milk products without the 100% Canadian milk logo, I consider milk with the 100% Canadian milk logo to be **safer to consume** (1= strongly agree, 5=strongly disagree)	455	1	5	1.87	0.856
In comparison to milk products without the 100% Canadian milk logo, I consider milk with the 100% Canadian milk logo to be of **higher quality (**1= strongly agree, 5=strongly disagree)	455	1	5	1.92	0.863
In comparison to milk products without the 100% Canadian milk logo, I consider milk with the 100% Canadian milk logo to be **more nutritious** (1= strongly agree, 5=strongly disagree)	455	1	4	2.25	0.826
In comparison to milk products without the 100% Canadian milk logo, I consider milk with the 100% Canadian milk logo to be **better value for the money** (1= strongly agree, 5=strongly disagree)	455	1	5	2.3	0.928

Respondents' Risk Profile

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
I would consider myself to be more of a risk taker than the average person (1= strongly agree, 5=strongly disagree)	455	1	5	2.95	0.99
I only purchase brands that have been tried and proven (1= strongly agree, 5=strongly disagree)	455	1	5	2.29	0.709
When purchasing a product that I use a lot, I tend to purchase the same brand each time (1= strongly agree, 5=strongly disagree)	455	1	5	2.05	0.745
New products are more risky than products which have been in the market for a while (1= strongly agree, 5=strongly disagree)	455	1	5	2.74	0.898
I don't believe in making risky investments (1= strongly agree, 5=strongly disagree)	455	1	5	2.68	1.049
A little risk is good (1= strongly agree, 5=strongly disagree)	455	1	5	2.41	0.802

Respondents' Perceptions

Question: Imagine that you are at the supermarket shopping for Ice cream you see a brand Ice cream with which you are unfamiliar. The product however displays the 100% Canadian milk logo. I would never purchase that product (1=strongly agree, 5=strongly disagree)

	N	Min.	Max.	Mean	Std. Deviation
I would never purchase that product (1=strongly agree, 5=strongly disagree)	455	1	5	3.61	0.989
I would be reluctant to buy it but would consider it (1=strongly agree, 5=strongly disagree)	455	1	5	2.93	0.982
I would purchase it if it is cheaper (1=strongly agree, 5=strongly disagree)	455	1	5	2.45	0.949
I would purchase it regardless of the cost (1=strongly agree, 5=strongly disagree)	455	1	5	3.42	0.983
I would purchase it if the price is in the normal range (1=strongly agree, 5=strongly disagree)	455	1	5	2.37	0.855

Respondents' Domestic Values

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
I think that buying a local product instead of a foreign product helps to support the local economy (1= strongly agree, 5=strongly disagree)	455	1	5	1.56	0.757
I consider myself to be patriotic (1= strongly agree, 5=strongly disagree)	455	1	5	2.02	0.955
I feel a sense of joy and pride whenever I see the maple leaf symbol known to be associated with Canada (1= strongly agree, 5=strongly disagree)	455	1	5	1.93	0.943
I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range (1= strongly agree, 5=strongly disagree)	455	1	5	1.99	0.994
I am usually interested in trying out foreign products (1= strongly agree, 5=strongly disagree)	455	1	5	2.95	0.886
We should buy from foreign countries only those products that we cannot obtain within our own country (1= strongly agree, 5=strongly disagree)	455	1	5	2.49	0.964
It is not right to purchase foreign products, because it puts Canadians out of jobs (1= strongly agree, 5=strongly disagree)	455	1	5	2.81	1.064
I am usually not concerned about the origin of foods that I purchase (1= strongly agree, 5=strongly disagree)	455	1	5	3.41	1.13
Have you ever lived or worked on a farm? (1= yes, 5= no)	455	1	2	1.78	0.415
On average how often do you shop at a farmers' market per month? (1= never, 5= more than 4 times)	455	1	5	1.83	0.924

Health Profiles

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
On average, how often do you exercise? (1= everyday, 5= I never get the time)	455	1	5	3.04	1.259
On average, how often do you take health supplements? (1=everyday, 5=never)	455	1	5	3.11	1.715
How often do you eat **burgers** from a fast food restaurant? (1=everyday, 5=never)	455	1	5	3.98	0.755
How often do you eat p**izza** from a fast food restaurant? (1=everyday, 5=never)	455	1	5	4	0.645
How often do you eat **fries** from a fast food restaurant?) (1=everyday, 5=never)	455	1	5	3.95	0.737
How often do you eat h**ot dogs** from a fast food restaurant?) (1=everyday, 5=never)	455	1	5	4.41	0.748
How often do you eat **pastry** from a fast food restaurant? (1=everyday, 5=never)	455	1	5	4.06	0.93
How often do you eat **fried chicken** from a fast food restaurant? (1=everyday, 5=never)	455	1	5	4.31	0.703
How often do you purchase food labelled as Natural or Organic? (1= always, 5=never)	455	1	5	3.38	0.961
Life is too short to spend worrying about my health so I just enjoy life and all food in general (1=strongly agree, 5= strongly disagree)	455	1	5	3.26	1.094
Doctors are in charge of my health therefore, I am not concerned about it (1=agree , 5=strongly disagree)	455	1	5	4.09	0.921

Demographic Profiles

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
What is your gender? (1=male, 1= female)	455	1	2	1.52	0.5
Do you or any member of your household suffer from any dietary related health issues such as high blood pressure, high cholesterol or heart disease? (1=yes, 2=no)	455	1	2	1.65	0.477
Are you or any member of your household allergic to dairy products? (1=yes, 2-no)	455	1	2	1.93	0.26
Which of the following group best describes your household's gross annual income? (1= less than $25000, 7= more than $150000)	455	1	7	3.37	1.633
What is the highest level of education that you have completed? (Less than high school, 7= graduate degree)	455	1	7	4.08	1.687
Please indicate which category best describes your age (1= under 20, 6= 66 and over)	455	1	6	3.63	1.304
How many people reside in your household, including yourself? (1=1 , 4= over 7)	455	1	4	1.9	0.536

Appendix I: Descriptive Statistics- Ice Cream Survey

Respondents' Purchasing Habits and Perceptions

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
On average, how often do you purchase Ice cream in a three month period (i.e. each quarter)? (1=never, 5=more than 4 times)	453	2	5	3.09	1.049
On average, approximately what container size of Ice cream do you purchase most frequently (1=smallest, 5= largest)	453	1	5	2.77	1.185
Are you aware of the 100% Canadian Milk brand? (1=Yes, 2=No)	453	1	2	1.10	.296
In a typical three month period how often do you purchase dairy Ice cream with the 100% Canadian Milk label (1=never, 5=More than 4 times)	453	1	5	2.39	1.320
In a typical three month period how often do you purchase dairy Ice cream with the Both 100% Canadian Milk and Organic labels (1=never, 5=More than 4 times)	453	1	5	1.34	.811
In a typical three month period how often do you purchase dairy Ice cream with a Store Brand label (1=never, 5= more than 4 times)	453	1	5	1.84	1.009
In a typical three month period how often do you purchase dairy Ice cream with the a National Brand label (1=never, 5= more than 4 times)	453	1	5	2.47	1.181
In a typical three month period how often do you purchase dairy Ice cream with both 100% Canadian milk and Store Brand labels (1=never, 5= more than 4 times)	453	1	5	1.69	1.054
In a typical three month period how often do you purchase dairy Ice cream with both 100% Canadian milk and National Brand labels (1=never, 5=more than 4 times)	453	1	5	2.03	1.175
In a typical three month period how often do you purchase dairy Ice cream with both Organic and Store Brand labels (1=never, 5= more than 4 times)	453	1	5	1.18	.578
In a typical three month period how often do you purchase dairy Ice cream with both Organic and National Brand labels (1=never, 5= more than 4 times)	453	1	5	1.21	.671

Consumers' Perceptions towards the 100% Canadian milk Brand

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **a quality product (**1= strongly agree, 5=strongly disagree**)**	453	1	5	1.69	.789
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **a local product** (1= strongly agree, 5=strongly disagree)	453	1	5	2.16	.969
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **a nutritious product** (1= strongly agree, 5=strongly disagree)	453	1	5	2.11	.885
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **an inferior product** (1= strongly agree, 5=strongly disagree)	453	1	5	3.88	1.121
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **an expensive product** (1= strongly agree, 5=strongly disagree)	453	1	5	3.07	.874
If I saw a product displaying the 100% Canadian milk brand logo, I would consider that product to be **a healthy product** (1= strongly agree, 5=strongly disagree)	453	1	5	2.25	.881
In comparison to milk products without the 100% Canadian milk logo, I consider milk with the 100% Canadian milk logo to be **safer to consume** (1= strongly agree, 5=strongly disagree)	453	1	5	2.00	.802
In comparison to milk products without the 100% Canadian milk logo, I consider milk with the 100% Canadian milk logo to be of **higher quality (**1= strongly agree, 5=strongly disagree)	453	1	5	1.97	.817
In comparison to milk products without the 100% Canadian milk logo, I consider milk with the 100% Canadian milk logo to be **more nutritious** (1= strongly agree, 5=strongly disagree)	453	1	4	2.26	.773
In comparison to milk products without the 100% Canadian milk logo, I consider milk with the 100% Canadian milk logo to be **better value for the money** (1= strongly agree, 5=strongly disagree)	453	1	5	2.34	.880

Respondents' Risk Preference

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
I would consider myself to be more of a risk taker than the average person (1= strongly agree, 5=strongly disagree)	453	1	5	3.09	1.043
I only purchase brands that have been tried and proven (1= strongly agree, 5=strongly disagree)	453	1	5	2.43	.708
When purchasing a product that I use a lot, I tend to purchase the same brand each time (1= strongly agree, 5=strongly disagree)	453	1	5	2.11	.680
New products are more risky than products which have been in the market for a while (1= strongly agree, 5=strongly disagree)	453	1	5	2.88	.960
I don't believe in making risky investments (1= strongly agree, 5=strongly disagree)	453	1	5	2.64	1.063
A little risk is good (1= strongly agree, 5=strongly disagree)	453	1	5	2.45	.841

Respondents' Domestic Values

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
I think that buying a local product instead of a foreign product helps to support the local economy (1= strongly agree, 5=strongly disagree)	453	1	5	1.55	.750
I consider myself to be patriotic (1= strongly agree, 5=strongly disagree)	453	1	5	1.91	.878
I feel a sense of joy and pride whenever I see the maple leaf symbol known to be associated with Canada (1= strongly agree, 5=strongly disagree)	453	1	5	1.87	.891
I will ALWAYS buy a domestic product over a foreign product if the prices are within the same range (1= strongly agree, 5=strongly disagree)	453	1	5	1.97	.955
I am usually interested in trying out foreign products (1= strongly agree, 5=strongly disagree)	453	1	5	2.99	.891
We should buy from foreign countries only those products that we cannot obtain within our own country (1= strongly agree, 5=strongly disagree)	453	1	5	2.53	.920
It is not right to purchase foreign products, because it puts Canadians out of jobs (1= strongly agree, 5=strongly disagree)	453	1	5	2.82	1.026
I am usually not concerned about the origin of foods that I purchase (1= strongly agree, 5=strongly disagree)	453	1	5	3.31	1.073
Have you ever lived or worked on a farm? (1= yes, 5= no)	453	1	2	1.75	.432
On average how often do you shop at a farmers' market per month? (1= never, 5= more than 4 times)	453	1	5	1.84	.902

Perceptions of the 100% Canadian milk brand

Question: Imagine that you are at the supermarket shopping for Ice cream you see a brand Ice cream with which you are unfamiliar. The product however displays the 100% Canadian milk logo. I would never purchase that product (1=strongly agree, 5=strongly disagree)					
	N	Min.	Max.	Mean	Std. Deviation
I would never purchase that product (1=strongly agree, 5=strongly disagree)	453	1	5	3.80	.909
I would be reluctant to buy it but would consider it (1=strongly agree, 5=strongly disagree)	453	1	5	3.09	.970
I would purchase it if it is cheaper (1=strongly agree, 5=strongly disagree)	453	1	5	2.47	.920
I would purchase it if the price is in the normal range (1=strongly agree, 5=strongly disagree)	453	1	5	2.28	.790
I would purchase it regardless of the cost (1=strongly agree, 5=strongly disagree)	453	1	5	3.43	.956

Respondents' Health Profile

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
On average, how often do you exercise? (1= everyday, 5= I never get the time)	453	1	5	2.87	1.316
On average, how often do you take health supplements? (1=everyday, 5=never)	453	1	5	3.00	1.771
How often do you eat **burgers** from a fast food restaurant? (1=everyday, 5=never)	453	1	5	4.00	.744
How often do you eat p**izza** from a fast food restaurant? (1=everyday, 5=never)	453	1	5	3.99	.690
How often do you eat **fries** from a fast food restaurant?) (1=everyday, 5=never)	453	1	5	3.95	.728
How often do you eat h**ot dogs** from a fast food restaurant?) (1=everyday, 5=never)	453	1	5	4.44	.778
How often do you eat **pastry** from a fast food restaurant? (1=everyday, 5=never)	453	1	5	4.11	.906
How often do you eat **fried chicken** from a fast food restaurant? (1= everyday, 5= never)	453	2	5	4.33	.716
How often do you purchase food labelled as Natural or Organic? (1= always, 5=never)	453	1	5	3.35	.916
Life is too short to spend worrying about my health so I just enjoy life and all food in general (1=strongly agree, 5= strongly disagree)	453	1	5	3.35	1.096
Doctors are in charge of my health therefore, I am not concerned about it (1=agree , 5=strongly disagree)	453	1	5	4.18	.899

Respondents' Demographics

Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
What is your gender? (1=male, 1= female)	453	1	2	1.56	.497
How many people reside in your household, including yourself? (1=1 , 4= over 7)	453	1	3	1.93	.498
Do you or any member of your household suffer from any dietary related health issues such as high blood pressure, high cholesterol or heart disease? (1=yes, 2=no)	453	1	2	1.65	.477
Are you or any member of your household allergic to dairy products? (1=yes, 2-no)	453	1	2	1.91	.287
Which of the following group best describes your household's gross annual income? (1= less than $25000, 7= more than $150000)	453	1	7	3.23	1.674
What is the highest level of education that you have completed? (Less than high school, 7= graduate degree)	453	1	7	4.06	1.729
Please indicate which category best describes your age (1= under 20, 6= 66 and over)	453	1	6	3.75	1.416

Appendix J: Industry Knowledge and Education

Variable	Coefficient	T-ratio	WTP	T-ratio
CAND	.643***	0.00	1.047***	0.00
Org	-.197***	0.00	-.32***	0.00
Nat	.09***	0.00	.146***	0.00
EDUKNW[37]	.188**	0.04	.307**	0.04
PRICE	-.615***	0.00	-	-
ASC1	-4.***	0.00	-	-
Psuedo R^2		0.190		
Log likelihood Function		-3709.558		
***,** and * represent significance at the 1%, 5% and 10% level respectively				

Appendix K: Testing for IIA

Under the null hypothesis (IIA holds), therefore if an alternative is omitted (estimating a restricted model) the ratio of choosing an alternative over another does not change.

Under the alternative IIA does not hold, excluding an alternative affects the substitution patterns

Hausman's specification test is distributed as χ^2 with K degrees of freedom (the number of independent variables)

[37] Interaction between education and knowledge

IIA test- Milk Sample

Choice	(prop.)	Weight	IIA
1	0	1	*
2	0.495	1	
3	0.425	1	
4	0.080	1	
Hausman test for IIA. Excluded choices are 1 ChiSqrd[5] =2961.4670, Pr(C>c) = .000000			

IIA test – Ice cream Sample

Choice	(prop.)	Weight	IIA
1	0	1	*
2	0.465	1	
3	0.396	1	
4	0.139	1	
Hausman test for IIA. Excluded choices are 1 ChiSqrd[5] =*********, Pr(C>c) = .000000			

Based on this test, the null of independence of irrelevant alternatives (IIA) cannot be accepted for either the milk or ice cream sample. Therefore, a less restricted model will provide better results.